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1903 EDITION

THE CAR BUILDERS' DICTIONARY

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AN ILLUSTRATED VOCABULARY OF TERMS WHICH DESIGNATE AMERICAN RAILROAD CARS, THEIR PARTS, ATTACHMENTS, AND DETAILS OF CONSTRUCTION

FOUR THOUSAND NINE HUNDRED AND SEVENTY-ONE ILLUSTRATIONS

COMPILED FOR THE MASTER CAR BUILDERS' ASSOCIATION

By RODNEY HITT, B. M. E.

ASSISTED BY

A. M. WAITT, *Late Superintendent of Motive Power, New York Central & Hudson River.*
J. S. LENTZ, *Master Car Builder, Lehigh Valley.*
W. P. APPLEYARD, *Master Car Builder, New York, New Haven & Hartford.*

THE FIRST EDITION OF THE CAR BUILDERS' DICTIONARY WAS PUBLISHED BY THE RAILROAD GAZETTE IN 1879, UNDER CONTRACT WITH AND UNDER THE DIRECTION OF THE MASTER CAR BUILDERS' ASSOCIATION. IT CONTAINED 811 ENGRAVINGS.
IT WAS REVISED AND PUBLISHED UNDER SIMILAR CONDITIONS IN 1884, AND CONTAINED 2188 ENGRAVINGS.
IT WAS REVISED AND SIMILARLY PUBLISHED IN 1895 AND CONTAINED 5683 ENGRAVINGS.

NEW YORK
THE RAILROAD GAZETTE, 83 FULTON STREET
1903

ACTION OF THE MASTER CAR BUILDERS' ASSOCIATION.

At the Fifth Annual Convention, held in Richmond, Va., in 1872 it was

"Resolved, That a committee be appointed with power to publish an illustrated book, defining the proper terms or names of each and every part used in the construction of railway cars, and a description of the use of the same."

At the Fourteenth Annual Convention, held in Detroit in 1880,

"The committee to whom was assigned the duty of preparing a Dictionary of Terms used in the Construction of Cars submitted a copy of the book and reported that they had finished their work, and were discharged."

At a meeting of the Executive Committee held in Saratoga, June 17, 1902, the letter ballot vote of the members of the Executive Committee on the appointment of a committee, consisting of Messrs. A. M. Waitt, W. P. Appleyard and John S. Lentz, to supervise the publication of a new M. C. B. Dictionary by the *Railroad Gazette*, was formally accepted and made a record of the meeting.

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1903.

PREFACE.

The original idea of the Car Builders' Dictionary, begun by the Master Car Builders' Association in 1872, was to standardize car building language. The first and successive editions have accomplished this and tremendously more—the book has been the most efficient single force for securing standardization of cars and parts of cars. Since the enlargement of the scope of the 1895 edition, however, a new and more important use has been found for the book. In every country on the globe where there are railroads it is now used as a guide for ordering, designing and specifying cars, and parts of cars. The present edition has been prepared with a view to facilitate the use of the book for such purposes. Wherever possible, the name of the maker of each device has been placed under the engraving and in many cases, the maker's designation, or number of the part has been preserved. This, it is believed, will add to the value of the book and should not be taken as an advertisement for the makers of such equipment.

While the definitions, as originally laid down and from time to time revised, have not been materially changed in this edition, they have been carefully edited with a view to eliminating the ancient history which many of them contained, condensing and modernizing the descriptive matter and making that part of the book more of a ready-reference section than an encyclopedia. To those who are actively engaged in railroad work, there is little need of more than a concise definition and the reference to an illustration shown elsewhere. To the novice, a clearly understood drawing is worth more than a page of necessarily technical description.

The number of illustrations has been reduced from 5,683 in 1895 to 4,971 in 1903, but this has been done in such a way as to increase the scope of the book. The aim has been to show nothing that is experimental or rapidly going out of use, but only such devices and cars as are in general use at this time. In making up the engravings, wherever possible, duplication of identical parts has been avoided, and in this way the number of engravings has been reduced, while at the same time the number of different types of cars and car parts has been increased. Standardization of designs and the constant tendency toward uniformity for interchange equipment during the last few years has also allowed the use of a less number of engravings in illustrating prevailing practice in car body and truck details.

No change has been made in the general arrangement of the illustrated pages from that used in previous editions. One new feature, however, has been added, that of Car Shop Machinery. While not strictly within the province, it will no doubt prove an acceptable addition to the rest of the subject matter, inasmuch as it is often as important to be familiar with the tools as to be familiar with their product. The engravings have been limited to a few of the most common forms of wood working machines and pneumatic tools, so largely used in steel car repairs. Machine tools more properly belong to the motive power department, and hence have not been included.

Particular attention has been paid to the selection of drawings of freight car bodies. Since the last edition was published an almost complete revolution in car construction has come about. The steel car, which at that time was an untried experiment, has made rapid strides forward, and in so doing has forced the builders of wooden cars to keep pace and meet the ever-increasing demand for higher capacities and reduced dead loads. While the wooden car still holds the lead in point of numbers, the tendency is the other way, and with this idea in mind the editor has shown steel cars perhaps at more length than the present situation would warrant. Those illustrated represent the latest types and may be taken as good examples of present practice. No attempt has been made to go into details with most of the drawings of steel cars, since they are built under patents and the manufacturers are reluctant to show their detail designs. In nearly all cases, however, enough dimensions and details are shown on the general drawing to serve all practical purposes. Wooden cars, which are usually built after the designs and specifications of the railroad company ordering them, have been shown more in detail. In putting dimensions on all the drawings care has been used in selecting only those which are essential and omitting for the sake of clearness a large part of the unessential figures. Reference numbers and letters have been placed on one or more of each of the different types of cars, but it was not thought necessary to supply them on all figures, since they are given once in each case.

All of the large car building companies have adopted standard systems of framing for passenger cars, applicable in a slightly modified form to almost any design. The illustration of each type covers a large proportion of the passenger equipment now in use. By showing the general types of framing only, the number of engravings in this part of the book has been greatly reduced. The interior and exterior arrangements and finish are much better shown in the floor plans and half-tone plates than would be possible with detail line drawings.

Some criticism might be made on the rather meager treatment of electric cars. The editor feels that to do this large field justice another work as comprehensive as this, but devoted exclusively to electric equipment, would be necessary, and sincerely hopes that this work will be undertaken by hands more competent to do full credit to this branch of car building than his could possibly be.

In preparing that part of the book which includes the Master Car Builders' standards and recommended practice, the aim has been to preserve as nearly as possible the order in which the engravings appear in the proceedings of the Association, and under each engraving is given the reference to the plates shown in the

proceedings for 1902. With one or two exceptions all of the historical and descriptive matter printed under the head of Rules for Interchange of Traffic, and Standards and Recommended Practice has been included in the section of the book devoted to definitions.

As in all compilations of this kind, mistakes are sure to occur. The work of preparing so many engravings and making a thorough revision of the definitions in the short time allowable involves many chances for errors of admission and omission. Some of these have already come to light and as many as possible corrected, but doubtless some others will be found.

In conclusion, the editor wishes to express his admiration for the thoroughness and accuracy which has characterized the work of those men who, from time to time, have successively made and remade this book, and without which the work of preparing the present edition might have been a formidable task. Acknowledgments are due to Mr. A. M. Waitt, Mr. W. P. Appleyard and Mr. John S. Lentz, members of the Supervising Committee of the Master Car Builders' Association, for valuable assistance and timely advice, and also to Mr. Arthur G. Tartas, under whose direction the engravings were prepared and to whom is due the credit for their uniformly excellent appearance. R. H.

New York, June, 1903.

DIRECTIONS

For Using the Car Builders' Dictionary.

To find the meaning of a given word or term, refer to it in the alphabetical list which constitutes the first half of the book, where a definition similar to those contained in ordinary dictionaries and a reference to some engraving illustrating the object—if it is capable of such illustration—will usually be found.

To find the name of a car, or part of a car, examine the alphabetical list of the different classes of engravings in the index which immediately precedes them, until the class is found to which the object looked for belongs, bearing in mind the **system of alphabetical classsification for the engravings,** which is as follows:

CARS, CAR BODIES, CAR BODY DETAILS, CAR FURNISHINGS, TRUCKS AND TRUCK DETAILS, M. C. B. STANDARDS AND RECOMMENDED PRACTICE, HAND CARS, ELECTRIC CARS. CAR SHOP MACHINERY.

By referring to the engravings included in that class a representation of the part or object sought will be found with either its name underneath or a reference number, by which number the name may be learned from the list of names of parts accompanying the illustration and usually to be found in the immediate vicinity.

PRESS OF
CHEROUNY PRINT AND PUB. CO
NEW YORK.

CLASSIFIED INDEX TO ADVERTISEMENTS

[For Alphabetical Index see page following last page of illustrations]

Air Brakes:
New York Air Brake Co., New York, N. Y.
Pennsylvania Air Brake Co., Washington, Pa.
Westinghouse Air Brake Co., Pittsburg, Pa.

Air Brake Hose:
Boston Belting Co., Boston, Mass.

Air Compressors:
Chicago Pneumatic Tool Co., Chicago, Ill.
Standard Traction Brake Co., New York.

Axles:
Allison Mfg. Co., Philadelphia, Pa.
American Car & Fdy. Co., St. Louis, Mo.
Baume & Marpent, Haine-St. Pierre, Belgium.
Bettendorf Axle Co., Davenport, Ia.
J. G. Brill Co., Philadelphia, Pa.
Cleveland City Forge & Iron Co., Cleveland, Ohio.
Gould Coupler Co., New York, N. Y.
Pittsburg Forge & Iron Co., Pittsburg, Pa.
Thos. Prosser & Son, New York, N. Y.
Russel Wheel & Fdy. Co., Detroit, Mich.

Bearings (Center and Side):
Baltimore Ry. Specialty Co., Baltimore, Md.
Chicago Ry. Equipment Co., Chicago, Ill.
W. H. Miner, Chicago, Ill.
Simplex Ry. Appliance Co., Hammond, Ind.
Western Ry. Equipment Co., St. Louis, Mo.

Bell and Signal Cord:
Samson Cordage Works, Boston, Mass.

Bell Cord Couplings:
Samson Cordage Works, Boston, Mass.

Belting (Rubber):
Boston Belting Co., Boston, Mass.

Bolsters:
American Steel Foundries, New York, N. Y.
American Car & Fdy. Co., St. Louis, Mo.
Bettendorf Axle Co., Davenport, Ia.
J. G. Brill Co., Philadelphia, Pa.
Buckeye Malleable Iron & Coupler Co., Columbus, O.
Pressed Steel Car Co., Pittsburg, Pa.
Simplex Ry. Appliance Co., Hammond, Ind.
Standard Steel Car Co., Pittsburg, Pa.

Brake Beams:
Chicago Ry. Equipment Co., Chicago, Ill.
Pressed Steel Car Co., Pittsburg, Pa.
Republic Ry. Appliance Co., St. Louis, Mo.
Simplex Ry. Appliance Co., Hammond, Ind.
Standard Steel Car Co., Pittsburg, Pa.

Brakes (See Air Brakes and Electric Brakes).

Brake Shoes:
American Brake Shoe & Fdy. Co., New York.
Buckeye Malleable Iron & Coupler Co. Columbus, O.
Coffin-Megeath Supply Co., Franklin, Pa.
Republic Ry. Appliance Co., St. Louis, Mo.

Brake Slack Adjusters:
American Brake Co., St. Louis, Mo.
Western Ry. Equipment Co., St. Louis, Mo.

Bumping Posts:
McCord & Co., Chicago, Ill.

Car Couplers:
American Steel Foundries, New York. N. Y.
Buckeye Malleable Iron & Coupler Co., Columbus, O.
Coffin-Megeath Supply Co., Franklin, Pa.
Gould Coupler Co., New York, N. Y.
Latrobe Steel & Coupler Co., Philadelphia, Pa.
McConway & Torley Co., Pittsburg, Pa.
Nat. Car Coupler Co. Wks., Converse, Ind.
Nat'l Malleable Castings Co., Cleveland, O.
Railway Appliance Co., Chicago, Ill.
Standard Coupler Co., New York, N. Y.
Washburn Coupler Co., Minneapolis, Minn.

Car Curtains:
Curtain Supply Co., Chicago, Ill.
Fabrikoid Co., Newburgh, N. Y.
Pantasote Co., New York, N. Y.

Car Door Fasteners (Freight):
Dayton Malleable Iron Co., Dayton, O.
National Malleable Castings Co., Cleveland, O.

Car Doors:
Chicago Grain Door Co., Chicago, Ill.
Jones Car Door Co., Chicago, Ill.
Western Ry. Equipment Co., St. Louis, Mo.

Car Heating:
Wm. C. Baker, New York.
Consolidated Car Heating Co., Albany, N. Y.
Gold Car Heating & Lighting Co., New York.
Safety Car Heating & Ltg. Co., New York.

Car Lighting:
Adams & Westlake Co., Chicago, Ill.
Commercial Acetylene Co., New York, N. Y.
Consolidated Car Heating Co., Albany, N. Y.
Gould Coupler Co., New York, N. Y.
Safety Car Heating & Ltg. Co., New York.

Car Roofing:
Drake & Weirs Co., Cleveland, O.
Excelsior Car Roof Co., St. Louis, Mo.
Standard Ry. Equipment Co., St. Louis, Mo.

Car Seats:
Adams & Westlake Co., Chicago, Ill.
American Car Seat Co., Brooklyn, N. Y.
Hale & Kilburn Mfg. Co., Philadephia, Pa.
Richards Chair-Panel Co., Chicago, Ill.
St. Louis Car Co., St. Louis, Mo.
Scarrett Furniture Co., St. Louis, Mo.

Cars (See Hand, Push, Velocipede.)

Cars (Freight):
Allison Mfg. Co., Philadelphia, Pa.
American Car & Fdy. Co., St. Louis, Mo.
American Steel Foundries, New York.
Barney & Smith Car Co., Dayton, O.
Baume & Marpent, Haine-St. Pierre, Belgium.
Goodwin Car Co., New York, N. Y.
Middletown Car Wks., Middletown, Pa.
Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill.
Pressed Steel Car Co., Pittsburg, Pa
Russel Wheel & Fdy. Co., Detroit, Mich.
Standard Steel Car Co., Pittsburg, Pa.

Cars (Miscellaneous):
Baume & Marpent, Haine-St. Pierre, Belgium.
Buda Fdy. & Mfg. Co., Harvey, Ill.
Fairbanks, Morse & Co., Chicago, Ill.
Russel Wheel & Fdy. Co., Detroit, Mich.

Cars (Passenger):
American Car & Fdy. Co., St. Louis, Mo.
Barney & Smith Car Co., Dayton, O.
Wason Mfg. Co., Springfield, Mass.

Cars (Street and Elevated):
American Car & Fdy. Co., St. Louis, Mo.
Barney & Smith Car Co., Dayton, O.
J. G. Brill Co., Philadelphia, Pa.
St. Louis Car Co., St. Louis, Mo.
Wason Mfg. Co., Springfield, Mass.

Car Steps:
Railway Appliances Co., Chicago, Ill.

Car Shop Machinery (See Wood Working Machinery).

Car Trimmings:
Adams & Westlake Co., Chicago, Ill.
Dayton Mfg. Co., Dayton, O.
Jas. L. Howard & Co., Hartford, Conn.

Car Upholstery:
Fabrikoid Co., Newburgh, N. Y.
Pantasote Co., New York, N. Y.

Car Wheel Presses:
Watson-Stillman Co., New York, N. Y.

Castings (See Forgings and Castings).

Castings (Bronze and Brass):
Adams & Westlake Co., Chicago, Ill.
Dayton Mfg. Co., Dayton, O.
Jas. L. Howard & Co., Hartford, Conn.
National-Fulton Brass Mfg. Co., Detroit, Mich.

Cranes:
Morgan Engineering Co., Alliance, O.
Wellman-Seaver-Morgan Engineering Co., Cleveland, O.

Crossing Gates:
Buda Fdy. & Mfg. Co., Harvey, Ill.

Curtains (See Car Curtains).

Curtain Fixtures:
Curtain Supply Co., Chicago, Ill.

Couplers (Air and Steam, Automatic):
Forsyth Automatic Air & Steam Coupler Co., Chicago, Ill.
Westinghouse Automatic Air & Steam Coupler Co., St. Louis, Mo.

Diaphragms (Vestibule):
Boston Belting Co., Boston, Mass.
Railway Appliances Co., Chicago, Ill.
G. S. Wood & Co., Chicago, Ill.

Door Checks:
Yale & Towne Mfg. Co., New York, N. Y.

Door Locks:
Dayton Mfg. Co., Dayton, O.
Jas. L. Howard & Co., Hartford, Conn.
Yale & Towne Mfg. Co., New York, N. Y.

Draft Rigging:
Butler Drawbar Attachm't Co., Cleveland, O.
Coffin-Megeath Supply Co., Franklin, Pa.
Dayton Malleable Iron Co., Dayton, O.
McConway & Torley Co., Pittsburg, Pa.
W. H. Miner, Chicago, Ill.
National Car Coupler Co. Wks., Converse, Ind.
Republic Ry. Appliance Co., St. Louis, Mo.
Standard Coupler Co., New York, N. Y.
Thornburgh Coupler Attachment Co., Ltd. Detroit, Mich.
Wellman-Seaver-Morgan Engineering Co., Cleveland, O.
Western Ry. Equipment Co., St. Louis, Mo.
Westinghouse Air Brake Co., Pittsburg, Pa.

Dust Guards:
American Dust Guard Co., Columbus, O.
Baltimore Ry. Specialty Co., Baltimore, Md.
Franklin Mfg. Co., Franklin, Pa.
Harrison Dust Guard Co., Toledo, O.
Holland Co., Chicago, Ill.
T. H. Symington & Co., Baltimore, Md.
G. S. Wood & Co., Chicago, Ill.

Dynamos:
Crocker-Wheeler Co., Ampere, N. J.
General Electric Co., Schenectady, N. Y.

Engines (Gasoline):
Fairbanks, Morse & Co., Chicago, Ill.

Electric Brakes:
General Electric Co., Schenectady, N. Y.
Westinghouse Traction Brake Co., New York.

Emergency Knuckles:
Railway Appliances Co., Chicago, Ill.

Expanded Metal:
Merritt & Co., Philadelphia, Pa.

Forgings and Castings:
Allison Mfg. Co., Philadelphia, Pa.
American Steel Foundries, New York, N. Y.
Baume & Marpent, Haine-St. Pierre, Belgium.
J. G. Brill Co., Philadelphia, Pa.
Buckeye Malleable Iron & Coupler Co., Columbus, O.
Buda Fdy. & Mfg. Co., Harvey, Ill.
Cleveland City Forge & Iron Co., Cleveland, O.
Dayton Malleable Iron Co., Dayton, O.
Gould Coupler Co., New York, N. Y.
Holland Co., Chicago, Ill.
Latrobe Steel & Coupler Co., Philadelphia.
Mt. Vernon Car Mfg. Co., Mt. Vernon Ill.
Nat. Car Coupler Co. Wks., Converse, Ind.
Nat'l Malleable Castings Co., Cleveland, O.

Pittsburg Forge & Iron Co., Pittsburg, Pa.
Thos. Prosser & Son, New York, N. Y.
Russel Wheel & Fdy. Co., Detroit, Mich.
Standard Steel Works, Philadelphia, Pa.
Vulcan Iron Works Co., Toledo, O.
Wellman-Seaver-Morgan Engineering Co., Cleveland, O.

Gaskets:
Boston Belting Co., Boston, Mass.
McCord & Co., Chicago, Ill.

Grain Doors (See Car Doors).

Hammers (Steam):
Morgan Engineering Co., Alliance, O.

Haud and Inspection Cars:
Buda Fdy. & Mfg. Co., Harvey, Ill.
Fairbanks, Morse & Co., Chicago, Ill.

Headlights:
Adams & Westlake Co., Chicago, Ill.
Dayton Mfg. Co., Dayton, O.
St. Louis Car Co., St. Louis, Mo.

Heaters (for Metal):
Walter Macleod & Co., Cincinnati, O.

Hoists (Pneumatic):
Chicago Pneumatic Tool Co., Chicago, Ill.

Hoisting Machinery:
Morgan Engineering Co., Alliance, O.
Wellman-Morgan-Seaver Engineering Co., Cleveland, O.

Hose:
Boston Belting Co., Boston, Mass.

Hydraulic Machinery:
Morgan Engineering Co., Alliance, O.
Watson-Stillman Co., New York, N. Y.

Iron (Pig):
Superior Charcoal Iron Co., Grand Rapids, Mich.

Jacks:
Chapman Jack Co., Cleveland, O.
Fairbanks, Morse & Co., Chicago, Ill.
A. O. Norton, Boston, Mass.
Watson-Stillman Co., New York, N. Y.

Journal Bearings:
Atlantic Brass Co., New York, N. Y.
McCord & Co., Chicago, Ill.
More-Jones Brass & Metal Co., St. Louis, Mo.
National-Fulton Brass Mfg. Co., Detroit, Mich.
St. Louis Car Co., St. Louis, Mo.

Journal Boxes and Lids:
Gould Coupler Co., New York, N. Y.
Holland Co., Chicago, Ill.
McCord & Co., Chicago, Ill.
Nat'nal Malleable Castings Co., Cleveland, O.
Railway Steel-Spring Co., New York, N. Y.
T. H. Symington & Co., Baltimore, Md.

Joints (Steam, Liquid or Air):
Boston Belting Co., Boston, Mass.
The Holland Co., Chicago, Ill.

Lamps and Lanterns:
Adams & Westlake Co., Chicago, Ill.
Dayton Mfg. Co., Dayton, O.
Jas. L. Howard & Co., Hartford, Conn.

Locks:
Adams & Westlake Co., Chicago, Ill.
Dayton Mfg. Co., Dayton, O.
Jas. L. Howard & Co., Hartford, Conn.
Yale & Towne Mfg. Co., New York, N. Y.

Lockers (Expanded Metal):
Merritt & Co., Philadelphia, Pa.

Lubricators (Journal Box):
Harrison Dust Guard Co., Toledo, O.

Machinery (See Metal Working Machinery and Wood Working Machinery).

Mats and Matting (Rubber):
Boston Belting Co., Boston, Mass.

Metal Working Machinery:
Ajax Mfg. Co., Cleveland, O.
Morgan Engineering Co., Alliance, O.

Motors, Generators (Electrical):
Crocker-Wheeler Co., Ampere, N. J.
General Electric Co., Schenectady, N. Y.

Office Furniture:
A. H. Andrew Co., Chicago, Ill.

Packing:
Boston Belting Co., Boston, Mass.
Franklin Mfg. Co., Franklin, Pa.

Paint:
Buckeye Paint & Varnish Co., Toledo, O.
Detroit Graphite Mfg. Co., Detroit, Mich.
Forest City Paint & Varnish Co., Cleveland, Ohio.
Lowe Bros. Co., Dayton, O.
Protectus Co., Philadelphia, Pa.
Republic Ry. Appliance Co., St. Louis, Mo.

Painting Machines:
Chicago Pneumatic Tool Co., Chicago, Ill.
Walter Macleod & Co., Cincinnati, O.

Platforms, Car:
Gould Coupler Co., New York, N. Y.
McConway & Torley Co., Pittsburg, Pa.
Nat. Car Coupler Co. Works, Converse, Ind.
Standard Coupler Co., New York, N. Y.

Platform Trap Doors:
O. M. Edwards Co., Syracuse, N. Y.

Pneumatic Tools:
Chicago Pneumatic Tool Co., Chicago, Ill.
Railway Appliances Co., Chicago, Ill.
Standard Ry. Equipment Co., St. Louis, Mo.

Push Cars:
Fairbanks, Morse & Co., Chicago, Ill.
Buda Fdy. & Mfg. Co., Harvey, Ill.

Rail Benders:
Watson-Stillman Co., New York, N. Y.

Rattan Car Seating:
American Car Seat Co., Brooklyn, N. Y.
Hale & Kilburn Mfg. Co., Philadelphia, Pa.

Rattan for Sweepers:
American Car Seat Co., Brooklyn, N. Y.

Rubber Goods:
Boston Belting Co., Boston, Mass.

Sash Balances:
O. M. Edwards Co., Syracuse, N. Y.

Sash Cord:
Samson Cordage Works, Boston, Mass.

Shade Rollers:
O. M. Edwards Co., Syracuse, N. Y.

Side Bearings (See Bearings).

Snaps:
Samson Cordage Co., Chicago, Ill.

Snow Flangers:
Ralway Appliances Co., Chicago, Ill.

Spring Dampener:
McCord & Co., Chicago, Ill.

Springs:
Allison Mfg. Co., Philadelphia, Pa.
J. G. Brill Co., Philadelphia, Pa.
Fort Pitt Spring & Mfg. Co., McKees Rocks, Pa.
Pittsburg Spring & Steel Co., Pittsburg, Pa.
Railway Steel-Spring Co., New York, N. Y.

Steam Shovels:
Vulcan Iron Works Co., Toledo, O.

Tires:
Thos. Prosser & Son, New York, N. Y.
Standard Steel Works, Philadelphia, Pa.

Train Pipe Coverings (Asbestos):
Franklin Mfg. Co., Franklin, Pa.

Treads (Rubber):
Boston Belting Co., Boston, Mass.

Trolley Cord:
Samson Cordage Works, Boston, Mass.

Trucks:
American Steel Foundries, New York, N. Y.
J. G. Brill Co., Philadelphia, Pa.
Commonwealth Steel Co., St. Louis, Mo.
Kindl Car Truck Co., Chicago, Ill.
Peckham Mfg. Co., Kingston, N. Y.
Pressed Steel Car Co., Pittsburg, Pa.
St. Louis Car Co., St. Louis, Mo.
Simplex Ry. Appliance Co., Hammond, Ind.
Standard Car Truck Co., Chicago, Ill.
Standard Steel Car Co., Pittsburg, Pa.

Tubing (Rubber):
Boston Belting Co., Boston, Mass.

Turnbuckles:
Cleveland City Forge & Iron Co., Cleveland, Ohio.

Valve Cord Hooks:
Samson Cordage Works, Boston, Mass.

Varnishes:
Buckeye Paint & Varnish Co., Toledo, O.

Vestibules:
Gould Coupler Co., New York, N. Y.
McConway & Torley Co., Pittsburg, Pa.

Velocipede Cars:
Buda Fdy. & Mfg. Co., Harvey, Ill.
Fairbanks, Morse & Co., Chicago, Ill.

Ventilators:
Railway Appliances Co., Chicago, Ill.

Washers:
Boston Belting Co., Boston, Mass.

Waste:
Franklin Mfg. Co., Franklin, Pa.
James L. Howard & Co., Hartford, Conn.

Water Closets:
Adams & Westlake Co., Chicago, Ill.
Dayton Mfg. Co., Dayton, O.
Jas. L. Howard & Co., Hartford, Conn.

Weather Strips:
O. M. Edwards Co., Syracuse, N. Y.

Wheels:
American Car & Fdy. Co., St. Louis, Mo.
Keystone Car Wheel Co., Pittsburg, Pa.
Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill.
Thos. Prosser & Son, New York, N. Y.
Railway Steel-Spring Co., New York, N. Y.
Russel Wheel & Fdy. Co., Detroit, Mich.
Standard Steel Works, Philadelphia, Pa.

Wheel Presses:
Watson-Stillman Co., New York, N. Y.

Window Fixtures:
O. M. Edwards Co., Syracuse, N. Y.

Woodworking Machinery:
J. A. Fay & Egan Co., Cincinnati, O.
Greenlee Bros. & Co., Chicago, Ill.
New Britain Machine Co., New Britain, Conn.
S. A. Woods Machine Co., South Boston, Mass.

Wrenches:
Coes Wrench Co., Worcester, Mass.

A DICTIONARY OF TERMS

USED IN

CAR-BUILDING.

A

"A, B, C" JOURNAL BEARING AND WEDGE. FIGS. 4091-98.

"A" CAR ROOF. A car roof with straight carlines, meeting at a point like rafters in the center of the upper deck.

"A" FRAME (Steam Shovel). 13, FIGS. 357-59. A strut to which are fastened the boom guys.

"A" FRAME STEP (Steam Shovel). 14, FIGS. 357-59.

ACCORDEON HOOD (Buhoup Vestibule). 124, FIGS. 1526-1630.

ACETONE. A colorless liquid obtained from the destructive distillation of wood which resembles alcohol and which has the property of absorbing acetylene gas under pressure in a high degree. It is used in the storage tanks of the COMMERCIAL STORAGE SYSTEM OF CAR LIGHTING, which see.

ACETYLENE GAS. A colorless gas, C_2H_2, produced when water is brought in contact with calcium carbide. It has a distinctive odor and burns with a bright, luminous flame. It has recently been used in car lighting with success. It may be generated in the car, as in the Adlake system, or carried in tanks filled with acetone under pressure, as in the Commercial storage system. See, ADLAKE SYSTEM and COMMERCIAL STORAGE SYSTEM.

ACME AUTOMATIC WINDOW SHADE. FIG. 3714. A car shade with a shade holding device, which consists of a hollow tube with a metallic guide at either end, through which two cords are passed, one end of each being fastened to the casing on either side of the shade near the top, the cords passing down the side to the bottom of the shade, thence through the tube and down the other side to the bottom, being fastened at the bottom of the window to the casing.

ACME BURNER. FIGS. 2702-07, etc. A burner constructed upon nearly the same principle as a locomotive headlight burner, and which gives a powerful light.

ACME DIAPHRAGM. FIG. 1805. A diaphragm for vestibules, made of fabric and heavily stitched at the joints.

ACME LAMP. A lamp fitted with an Acme burner.

ACME SPRING. A form of elliptic spring, the peculiarity of which consists in tapering a single leaf from the center toward the ends, without the use of a number of separate leaves. One type is constructed of plates with a beveled edge, arranged one above the other as usual, and held in position by a wrought iron band.

ACORN. FIG. 3027. A general term for the ornaments of tips resembling the acorn, used to finish the ends of rods of various forms.

ACORN BUTT HINGE. FIGS. 1942 and 1947-48. A trade term for hinges having the hinge pin ornamented with acorns at each end.

ADJUSTABLE FOOT REST. FIGS. 3148-3224. A sliding foot rest, supported by various mechanical devices—as by a ratchet arc or on rabbet pieces. A foot rest or rail under a seat which can be adjusted to suit the passenger using it. See, FOOT REST.

ADJUSTABLE LAMP CANOPY. FIG. 2666.

ADJUSTING SCREW (Pump Governor). 8, FIGS. 963-964.

ADLAKE ACETYLENE GAS SYSTEM OF CAR LIGHTING. FIGS. 2641-56. A system of car lighting using acetylene gas which is generated in the apparatus shown in FIGS. 2641-42, which is enclosed in one end of a car, as in FIG. 2643. The carbide is contained in cartridges, FIG. 2642, in pockets or baskets. The water flowing down from above and coming into contact with the carbide generates acetylene gas, which is stored in the receiving tank, FIG. 2656, under the car. The piping and arrangements through the car are similar to the Pintsch system. The form of lamp is shown in FIG. 2654.

ADVERTISING RACK RAIL (Street Cars). A rail to which the frames for advertising cards are screwed or otherwise fastened.

AIR

AIR BRAKE. Any brake operated by air pressure, but usually restricted to systems of continuous brakes operated by compressed air, in distinction from VACUUM BRAKES, which see, which are operated by creating a vacuum. The air is compressed by some form of pump on the locomotive, and is conveyed by pipes and flexible hose between the cars to cylinders and pistons under each car, by which the pressure is transmitted to the brake levers, and thence to the brake shoes. This system is what is now termed the plain air brake or straight air brake. This brake is now obsolete in steam road practice, having been replaced by the AUTOMATIC AIR BRAKE, which see, and also see WESTINGHOUSE AIR BRAKE, QUICK ACTION AUTOMATIC, EAMES VACUUM BRAKE, NEW YORK AIR BRAKE.

AIR BRAKES—GENERAL ARRANGEMENT AND DETAILS. FIGS. 4303-07 and below. The general arrangement and details of brake gear for air brake cars, as shown, are standard. The following standards have also been adopted in this connection: 1. Maximum train pipe pressure, 70 pounds per square inch. 2. Maximum brake power in freight cars, 70 per cent. of the light weight of car. 3. All levers 1 inch in thickness; all pins turned to 1 3-32 inches in diameter; all jaws or clevises made of ¾ inch by 2½ inch iron; all rods ¾ inch diameter. 4. Angle of brake beam lever, 40 degrees with vertical.

The revision made in 1896 consisted in the omission of such detail dimensions as could not be used in all cases, such as the length and proportions of main levers, and the omission of some of the smaller parts from the drawing, such as the pipe clamps, staples, etc. The dimensions of the cross section of the malleable iron truck lever connection were increased, and the letters W. I., M. I., C. I., etc., indicating the material of which the parts were to be made, were omitted from the drawing.

In 1898 the following changes were made:

Diameter of truck lever connection for outside hung brakes changed from ¾ inch to ⅞ inch, and a note to this effect was added under title on this sheet.

Diameter of hole for cotter in air brake pin was first indicated as 7-16 inch.

Addition was made to note under drawing of truck

lever connection for inside hung brakes as follows: "If made of round iron or steel, must not be less than 15/8 inches diameter."

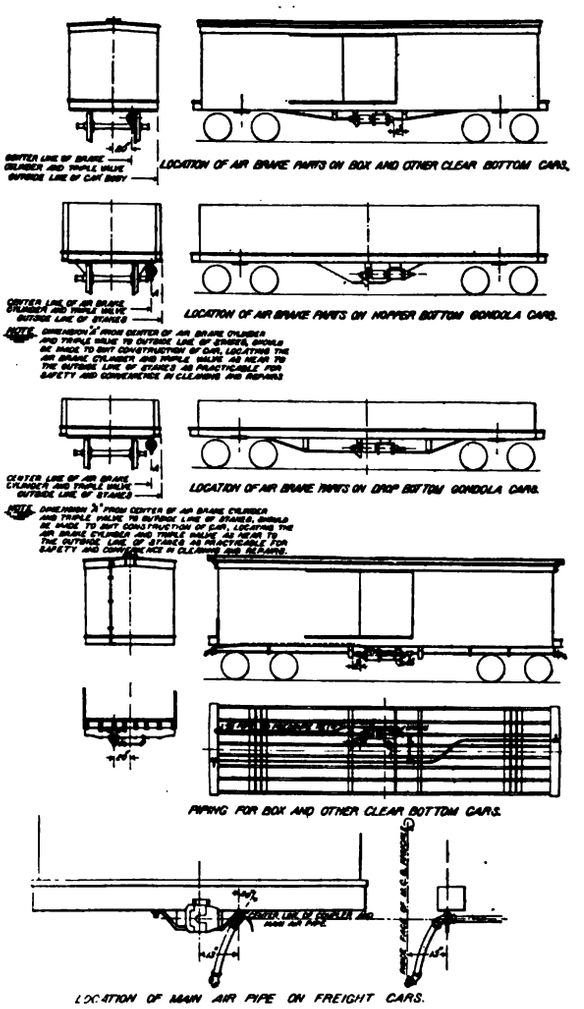
Dummy coupling was omitted from drawing and air hose was shown as hanging down.

The words "33 inches or" were omitted from height shown for air brake pipe above rail.

Diameter of release valve rod was changed from 1/4 inch to 3/8 inch.

In 1900 a standard brake pipe nipple, 10 inches long, was ordered shown located directly back of the angle cock.

See below for recommended practice for location of air brake parts.


LOCATION OF AIR BRAKE PARTS ON BOX AND OTHER CLEAR BOTTOM CARS.
LOCATION OF AIR BRAKE PARTS ON HOPPER BOTTOM GONDOLA CARS.
LOCATION OF AIR BRAKE PARTS ON DROP BOTTOM GONDOLA CARS.
PIPING FOR BOX AND OTHER CLEAR BOTTOM CARS.
LOCATION OF MAIN AIR PIPE ON FREIGHT CARS.

Air Brakes. General Arrangements and Details.—In 1899 a Recommended Practice for the location of air brake parts on different classes of cars was adopted, as follows:

1. Location of air brake cylinders and triple valves on box cars and other clear bottom cars.

2. Location of air brake cylinders and triple valves on hopper gondola cars and drop bottom gondola cars.

3. Arrangement of piping for clear bottom cars, or cars of the box car type.

4. Location of main air pipe at ends of cars.

5. As to the manner of fastening air cylinder reservoirs, retaining valves, etc., to the frame work of cars, the bolts fastening the cylinders and reservoirs should be either double nutted or cottered, so as to prevent the same from working loose. The air pipes should be fastened to the frame work of the car with a liberal number of clamps.

One elbow should be applied to the retaining valve pipe, it being located at the end sill of the car where pipe turns upward.

One union should be applied as close to the triple valve as practicable to permit the easy removal of same; the pipe to be carried along under side of the intermediate sill when practicable, from the triple valve to end of car, and be supported by either staples or clamps, not to exceed six feet apart.

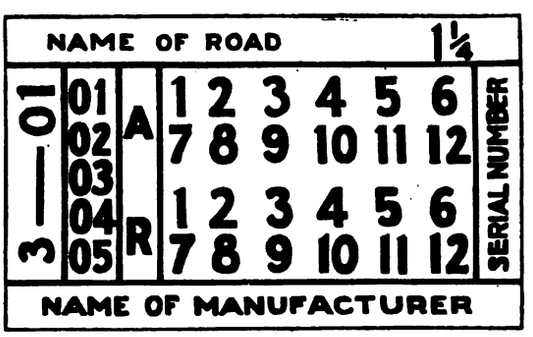
6. Badge for marking air brake hose to show dates of application and removal, manufacturer's name and name of railroad company.

Air Brake Cut-Out and Defect Card. (M. C. B. Recommended Practice.) See, Air Brake Repair Card.

Air Brake Hose. See, Brake Hose.

Air Brake Hose, Label for.—In 1902 the label for hose, as shown in the specifications for air brake hose, was made a standard. The specification for its use is as follows:

Each standard length of hose must be branded with the name of the manufacturer, year and month when made, and serial number, the initials of the railway company, and also have a table of raised letters at least 3-16 inch high to show the date of application and removal, thus:



All markings to be full and distinct and made on a thin layer of white or red rubber, vulcanized, and so applied as to be removed either by cutting with a knife or sharp instrument.

Air Brake Repair Card. (M. C. B. Recommended Practice.) In 1894 a recommended practice was adopted to use an air brake repair card, as shown, to report to division terminals such defects as are found by trainmen which require brake to be cut out. This was revised in 1898 and is now as shown on next page. To be attached as near to the car number as possible. In 1902, adopted as standard.

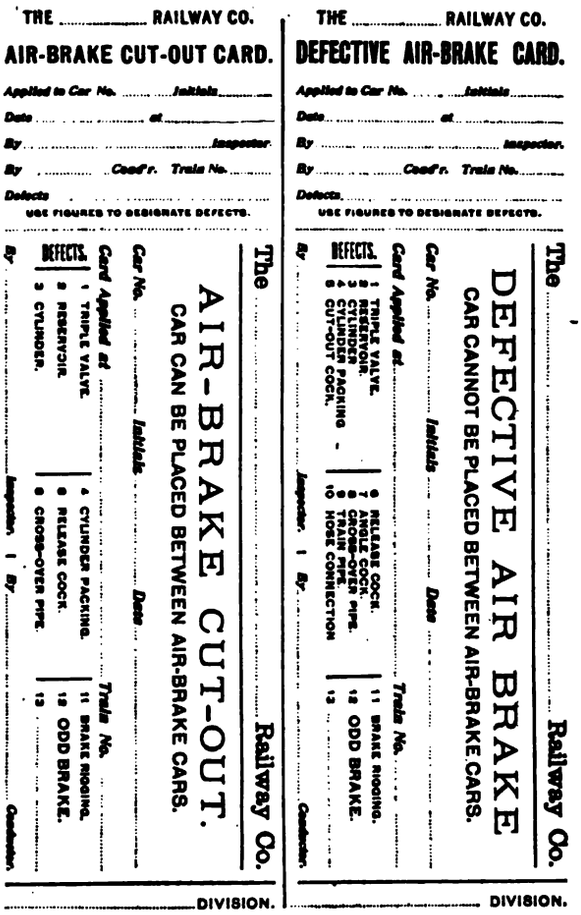
Air Brake Tests.—In 1895 a code for the guidance of the Committee on Air Brake Tests in testing triple valves was adopted as Recommended Practice for such tests, which code is as follows:

Conditions of Tests.—No. 1.—Construction of Rack.—Brakes will be tested on a rack representing the piping of a fifty 34-foot car train. All cocks, angles and connections will be as nearly as possible identical with those in train service. The rack shall conform to a blue print which is in hands of the committee, which gives the proper fitting, piping, dimensions of cylinder, auxiliary reservoirs, main reservoirs, engineer's valve, etc.

No. 2.—Pressure.—Tests will be made with a uniform train pipe pressure of 70 pounds.

No. 3.—Construction of Triples.—Triples must be constructed so that they can be secured and operated on apparatus conforming to diagrams, Figs. 1 and 2 (see pages 166 and 167 of the 1892 Annual Report).

No. 4.—To secure accuracy in measurement of time application and release tests, electrical recording apparatus will be used, arranged to give an indicator card in the fiftieth car.


THE ..... RAILWAY CO.

AIR-BRAKE CUT-OUT CARD.

Applied to Car No. ..... Initials .....

Date ..... at .....

By ..... Inspector.

By ..... Cond'r. Train No. .....

Defects .....

USE FIGURES TO DESIGNATE DEFECTS.

DEFECTS.

1 TRIPLE VALVE. 2 RESERVOIR. 3 CYLINDER. 4 CYLINDER PACKING. 5 RELEASE COCK. 6 CROSS-OVER PIPE. 11 BRAKE RIGGING. 12 ODD BRAKE.

Card Applied at ..... Car No. ..... Initials ..... Date .....

By ..... Inspector. 1 By ..... Conductor.

The ..... Railway Co.

AIR-BRAKE CUT-OUT.

CAR CAN BE PLACED BETWEEN AIR-BRAKE CARS.

..... DIVISION.

THE ..... RAILWAY CO.

DEFECTIVE AIR-BRAKE CARD.

Applied to Car No. ..... Initials .....

Date ..... at .....

By ..... Inspector.

By ..... Cond'r. Train No. .....

Defects .....

USE FIGURES TO DESIGNATE DEFECTS.

DEFECTS.

1 TRIPLE VALVE. 2 RESERVOIR. 3 CYLINDER. 4 CYLINDER PACKING. 5 CUT-OUT COCK. 6 RELEASE COCK. 7 ANGLE COCK. 8 CROSS-OVER PIPE. 9 TRAIN PIPE. 10 HOSE CONNECTION. 11 BRAKE RIGGING. 12 ODD BRAKE.

Card Applied at ..... Car No. ..... Initials ..... Date .....

By ..... Inspector. 1 By ..... Conductor.

The ..... Railway Co.

DEFECTIVE AIR BRAKE

CAR CANNOT BE PLACED BETWEEN AIR-BRAKE CARS.

..... DIVISION.

No. 5.—Tests shall be repeated three times under the same general conditions. The temperature at the time of the tests will be recorded.

No. 6.—Classification.—Triples shall be classified Nos. 1, 2, 3 and outlawed. In grading triples the reasons for their classification shall be given.

No. 7.—The three essentials for a quick action brake are as follows:

First. Graduation.

Second. Release.

Third. Quick action.

Rack Tests.—No. 1.—Application Test (a) (Service).—Brakes must show with full service application and 6 inches piston travel, a brake cylinder pressure of 50 pounds. The minimum pressure must not be less than 48 pounds, nor the maximum pressure over 52 pounds. This test will be made with:

(1) 4 inches piston travel.

(2) 6 inches piston travel.

(3) 12 inches piston travel.

The necessity for the 4-inch and 12-inch piston travel tests will depend upon the character of the brakes being tested.

NOTE.—The object of this test is to secure such proportion between the auxiliary reservoir and the brake cylinder as will give the desired maximum power in a full service application of the brake.

No. 2.—Application Test (b) (Emergency).—Brakes must be applied on the fiftieth car with at least 45 pounds pressure with 6 inches piston travel in three seconds from the first movement of the engineer's handle. They should indicate at least 55 pounds in three and one-half (3½) seconds. The final maximum pressure in this test must not be less than 15 per cent, nor more than 20 per cent, above the pressure given by the same brake in full service application.

This test will be made to determine that quick action is obtained in each case, with

(1) 4 inches piston travel.

(2) 6 inches piston travel.

(3) 12 inches piston travel.

NOTE.—The object of this test is to secure, as nearly as possible, uniformity of pressures in the brake cylinders in an emergency application, and as nearly as possible a uniformity of time required to attain the pressures; to secure a minimum length of stop, of shock and of trains parting.

No. 3.—Application Test (c).—Commencing with the first car from the engine, the brakes of three successive cars, or less, if they fail to jump three, will be cut out until the fifth, sixth and seventh are cut out, the brakes in each case to be applied as per Test No. 2. After the first series of three has been tested, in order to test the second series the first car must be cut in, and so on. The quick action brake should pass the three cars cut out and apply on the fiftieth car in the same time as in Test No. 2. Tests will be made with piston travel of 4 inches.

In addition, at least two other applications shall be made with three successive triples cut out in any portion of the rack beyond the fifth car.

NOTE.—In freight car service the most common method of remedying a defective brake is to cut the brake out; hence it is essential that a limited number of brakes can be cut out successfully without destroying the quick action feature.

No. 4.—Graduating Test (a).—Seventy pounds train pipe pressure having been secured, the following tests will be made:

(1) A reduction of 8 pounds in train pipe pressure. This should apply lightly the fifty brakes.

(2) A further reduction of 4 to 6 pounds. This should increase the braking power on all the brakes.

(3) A reduction of 30 pounds should equalize the pressure between the auxiliary reservoirs and brake cylinders. The piston travel in this test will be six inches.

(b).—One or more triples shall also be tested, having substituted for the brake cylinder a reservoir having the capacity of a cylinder with 8-inch stroke. The first admission to the cylinder should be made with a reduction of train pipe pressure not exceeding five pounds; each succeeding reduction should reduce the pressure in the auxiliary reservoir not to exceed three pounds, until full equalization takes place. The pressure in the train pipe should not be more than three pounds lower than the equalized pressure in the brake cylinder and reservoir at full equalization.

No. 5.—Test to Determine the Sensitiveness of the Service Valve.—Three valves selected at random will be taken for this test and each tried separately. They will be tested on a train pipe representing a locomotive and one car, the engine and tender brake being cut out.

A train pipe pressure of 70 pounds having been secured, the air will be discharged as rapidly as it may through an opening in the engineer's valve of two-sixty-fourths to three-sixty-fourths (2 to 3-64) inch diameter. Under this condition the service action must take place and continue to take place without any appearance of quick action (P E, Partial Emergency) until the disk has been enlarged up to and including a 10-64 opening.

NOTE.—The object of this test is to insure the working of triples in "service" with practically the same reduction of air.

No. 6.—Test to Determine the Sensitiveness of the Quick Action Valve.—The same three valves as in No. 5, or others selected at random, will be taken for

this test and each tried separately. They will be tested under the same train pipe conditions as Test No. 5. Engine and tender brake cut out.

A train pipe pressure of 70 pounds having been secured, the air will be discharged as rapidly as it may through disk openings, as in the preceding test, increasing in diameter by 1-64. Triples must not show a range of more than 3-64 before full quick action is reached. Full quick action must not take place before 11-64, but must take place when the opening is 14-64.

NOTE.—The object of this test is to check the introduction of triples which will cause a quick action application when not wanted.

No. 7.—Test to Determine the Holding Power of the Brake in Service Application and Quick Action Application.

(a) Service Application.—Gauges will be placed on the cylinder and auxiliary reservoir of the first, twenty-fifth and fiftieth cars with 70 pounds train pipe pressure; brakes will be applied by admitting, as nearly as may be, 15 pounds into the cylinder of the first car. Record of pressure in the auxiliary reservoirs and cylinders will be taken as follows:

(1) At the first application.

(2) In five minutes from first application.

(3) In ten minutes from first application.

(4) In fifteen minutes from first application.

(b) Quick Action Application.—This will be the same as above, except that all the air will be exhausted from the train pipe.

(c) Dummy Cylinder Test.—A modification of the holding test, as with the graduating test by the introduction of dummy cylinders.

No. 8.—Release Test.—The following conditions should be observed in this test:

(a) Main air reservoir cut in.

(b) Any pump or boiler pressure may be used that will maintain a uniform head of 90 pounds pressure.

A uniform pressure of 70 pounds having been secured in the train pipe, all the air will be exhausted by a quick action application. A pressure of 90 pounds will then be maintained against a diaphragm perforated by a 3-32 hole, and a record taken of all brakes that release inside thirty minutes. In making this test special care must be taken to see that there is no leak in the train pipe.

It will not be considered satisfactory if a greater proportion than ten per cent fail to release in the prescribed time.

NOTE.—This test, in addition to testing the release feature of the triples, is intended as an equivalent to a release after a break-in-two in train service.

No. 9.—Test to Determine the Time of Charging One Auxiliary Reservoir:

(a) Cut out the brake to be tested by the cut out cock.

(b) Bleed the auxiliary reservoir empty and close the bleed cock.

(c) Keep the pump running and maintain a head of 90 pounds in main air reservoir and train pipe during test.

(e) Cut in the brake to be tested and note from the reading of the gauge the time occupied in charging to 70 pounds. The time of charging should be 55 seconds. The reservoir should not be charged in less than 45 seconds nor more than 60 seconds.

NOTE.—The object of this test is to prevent irregular charging of auxiliary reservoirs, and thus insure that the front brakes will not apply after charging.

No. 10.—Test to Determine Whether Quick Action Will Follow a Service Application:

Commencing with a service application of 20 pounds pressure in the first cylinder a full quick action reduction will follow. It will be observed whether quick action takes place or not. The pressure in the first cylinder will be increased or decreased by steps of about 5 pounds until the point at which quick action ceases or commences is determined. Quick action should take place with not less than 20 pounds in the first cylinder.

NOTE.—The object of this test is to determine whether, after a service application, quick action can be obtained without first releasing the brakes.

No. 11.—Such additional tests as in the judgment of the committee the construction of the triples submitted to them for test warrants.

Train Tests.—No. 1.—In order to provide against defects which a rack test may not develop, it is recommended that railroads make a 50-car train test in actual service before accepting the result from the rack test as final.

No. 2.—In making Application Test No. 2 with a train, the measurement of time from the first car to the fiftieth car should be provided for. This will determine the time occupied by the engine brake as against the car brake.

No. 3.—Special care should be taken with the engine and tank brakes in order that they may do their share of the braking during the stops, and not pull away from the train.

No. 4.—All brake shoes must have a proper bearing on wheels, which is best accomplished by giving them some previous service before testing, and all should be of the same material.

No. 5.—Tests to determine the shock should be made on a level track, with all the slack in the train pulled out at the time the brakes are applied.

AIR CONTROLLER (Pintsch Lamp). 458, FIGS. 2605-21.

AIR CYLINDER GASKET (Air Pump). 103, 104, FIGS. 893-94 and 48, 49, FIG. 965. See, GASKET.

AIR CYLINDER OIL CUP (Air Pump). 53, FIG. 965; 98, FIGS. 893-94.

AIR FLUE (Refrigerator Cars). The vertical passage of the car through which the chilled air passes to enter the refrigerator.

AIR GAGE (Air Brake). FIG. 921. A gage to register the pressure of air in the reservoir, similar to an ordinary steam pressure gage.

AIR INLET. An opening for the admission of air to an air compressor or a refrigerator car. The term includes both the air strainer and air pipe.

AIR PIPE (Air Brake). More properly supply pipe or air inlet. The train brake pipe is sometimes called the air pipe.

AIR PIPE STRAINER (Air Brake). 106, FIGS. 893-94. Also called INLET STRAINER, which see. It is frequently a part of the DRAIN CUP, which see. FIGS. 945, 943, etc.

AIR PISTON (Air Brake). 66, FIGS. 893-94; 31 and 32, FIG. 965. The air pistons and steam pistons of engines and air pumps are generally alike in style of construction. See, PISTON.

AIR PISTON PACKING RINGS (Air Pump). 33 and 34, FIG. 965. See, AIR PISTON.

AIR PUMP AND MOTOR. FIGS. 4842-62. A machine for compressing air, mounted beneath the floor of a car, consisting of air cylinders, the pistons of which are direct driven by a slow speed electric motor. See, MOTOR DRIVEN AIR COMPRESSOR.

AIR PUMP AND ENGINE COMPLETE (Air Brake). See, ENGINE AND AIR PUMP. FIGS. 893-94 and 965.

AIR PUMP CYLINDER (Air Brake). 63, FIGS. 893-94 and 3-4, FIG. 965. A hollow cast iron cylinder with a piston, which piston compresses the air required to operate the brakes. The piston in the air cylinder is directly con-

nected with and is worked by the piston in the steam cylinder.

AIR PUMP CYLINDER HEAD (Air Brake). 64, FIGS. 893-94. The cover for the lower end of the air cylinder of an air pump for an air brake. See, CYLINDER HEAD.

AIR PUMP GOVERNOR. See, GOVERNOR. ELECTRIC PUMP GOVERNOR.

AIR SIGNAL REDUCING VALVE. See, REDUCING VALVE.

AIR SPACE (Refrigerator Cars). C, FIGS. 185-95. A space left between the linings to aid in insulation.

AIR STRAINER. 1. (Air Pump). 106, FIGS. 893-94. A funnel shaped mouthpiece on the end of the air inlet pipe, with a perforated plate over its mouth to exclude dirt, insects, etc.

2. (Train Brake Pipe). FIG. 945. An air strainer and drain cup, the purpose of which is to strain out particles of dust, scale, etc., and to drain moisture from the pipes.

AIR VALVE CHAMBER CAP (Air Pump). 89, FIGS. 893-94.

AIR VALVE, SEAT AND CAGE (Air Pump). 86, 87, 88, FIGS. 893-94 and 9-14, FIG. 965.

AISLE. The longitudinal passageway through a passenger car, between the seats.

AISLE SEAT END. FIG. 3215; 3, FIGS. 3151-52, etc. The end or arm of a transverse car seat next the aisle. See also, WALL SEAT END.

AJAX DIAPHRAGM. FIGS. 1799-1802. A cotton fabric diaphragm for vestibules made of sections riveted at the joints and bound with leather at the corners. Made in two styles, single for Pullman and double for Gould Vestibules.

AJAX TRUCK. FIGS. 3738-40. A pedestal truck using cast steel side frames and boster.

ALCOVE. A recess. See, FAUCET ALCOVE. LAMP ALCOVE. WATER ALCOVE.

ALCOVE FAUCET. FIGS. 2763-65. A faucet in a water alcove connected with a water cooler to supply drinking water. See, FAUCET.

ALCOVE FRONT. See, WATER ALCOVE FRONT.

ALCOVE LAMP. A lamp placed in a recess in the side of a car. Also called PANEL LAMP, which see, as it is usually covered by a panel.

ALCOVE PAN or BOTTOM. See, WATER ALCOVE PAN or BOTTOM.

ALLEN PAPER WHEEL. FIGS. 4152-66. A car wheel with a steel tire, a cast iron hub or center, and the space between the tire and center filled with compressed paper and held in place by wrought iron face plates on either side extending from the center to the tire and bolted thereto. See, STEEL TIRED WHEEL.

ALLEYWAY. More properly a corridor. A narrow passage at the side of staterooms or compartments in parlor or sleeping cars. FIG. 127.

AMERICAN CAR COUPLER. FIGS. 1454-63.

AMERICAN (Continuous) DRAFT AND BUFFING APPARATUS. An apparatus by which the drawbars at both ends of the car are connected by two rods with loops at the ends, that hook over the ends of a bar passing through the shank of each drawbar. Each car is in this manner pushed from the rear end and all the pull is transmitted through the train by the draft rods. It has two buffer springs and two follower plates at each end of the car.

AMERICAN DUST GUARD. FIG. 4090. A dust guard in two pieces, which are held together and against the axle by a spring.

AMERICAN STUDENT LAMP. See, ARGAND LAMP, STUDENT LAMP.

ANGLE CLIPS (Janney Freight Coupler). Plates to fit the angles or bends of an uncoupling rod. They are fastened by angle clip bolt.

ANGLE COCK (Air Brakes). FIG. 944. A cock placed in the train pipe under each end of the car just in front of the hose connection. This must always be open except at the rear end of the last car, where it must always be closed to prevent escape of air from the train line and setting of the brakes.

ANGLE COCK (Consolidated Car Heating). FIG. 2303. An angle valve for controlling inflow of steam to the heating apparatus.

ANGLE IRON. A general term applied by makers to iron rolled in the form of an L, but with the corner rounded off somewhat. When the angle is rolled to a sharp corner and not rounded off, it is termed square root iron.

ANTI-FRICTION CAR DOOR HANGER. FIGS. 2153-60. See, CAR DOOR HANGER.

ANTI-FRICTION SIDE BEARINGS AND CENTER PLATES. FIGS. 4123-37. Devices, a few of which are shown, to eliminate the friction between body and truck in curving. The two general forms are roller side bearings and ball bearing side bearings and center plates.

ANTI-TELESCOPING DEVICE. A type of end framing adopted by the Pullman Company, in which the end sill is greatly strengthened by an end sill stiffening plate, an end sill stiffening angle bar, corner angle posts, and end plate strengthening angles, knee irons, etc., as shown in the engravings. The device is known as the "Sessions" anti-telescoping device, and the patents are owned by the Pullman Company.

ANVIL (of Track Torpedoes). Interior pieces of iron placed directly over the fulminating powder to insure its ignition. Some track torpedoes have three anvils.

APRON. See, DOOR APRON, ROOF APRON, BUNK APRON.

ARBEL WHEEL. In this country, strictly, a wheel with a wrought iron center, plate or spokes, and a steel tire manufactured by the Arbel establishments, Rive de Gier, France. The wheels as built at the Arbel shops are built up of loose parts and then heated and forged solid under a steam hammer. Now little used.

ARBOR. "A spindle or axle for a wheel or pinion; a mandrel on which a ring or wheel is turned in a lathe."—Knight. See, DOOR LATCH ARBOR.

ARCH (Elliptic Spring). The height from the center of the scrolls at the ends of the elliptics to the under side of the main leaf of the spring. Twice the arch of an elliptic spring, less the thickness of the spring bands, is the set and is the maximum amount which an elliptic spring can be compressed. In a half elliptic spring the arch and set differ only in the thickness of the spring band.

ARCH BAR. FIGS. 4433-43; 14, FIGS. 3735-3951. A bent wrought iron or steel bar, which forms the top member of an iron truck side frame. In the diamond truck the next lower member is the inverted arch bar, and the next lower (occasionally used) is the auxiliary arch bar, 16, FIGS. 3735-3951. The tie bar comes under all, and sometimes becomes an arch bar. See also, CENTER BEARING ARCH BAR and CENTER BEARING INVERTED ARCH BAR, for six wheel trucks.

ARCH BARS AND COLUMN BOLT FOR 80,000-POUND CAPACITY CARS (M. C. B. Standard). FIGS. 4433-43. In 1897 a committee on this subject reported designs, which were subsequently adopted by letter ballot as Recommended Practice. Proceedings 1897, pages 188 to 192.

In 1901 these were, by letter ballot, changed from Recommended Practice to Standard.

ARCH PLATE (Buhoup Vestibule). 91, FIGS. 1526-1630.

ARCH PLATE AND BUFFER SPRING (Buhoup Vestibule). 46, FIGS. 1526-1630.

ARCH PLATE BAND (Buhoup Vestibule). 49, FIGS. 1526-1630.

ARCH RAIL (English). See, END ARCH RAIL.

ARCHED ROOF. A roof, the surface of which is curved. Some boudoir and private cars are built with arched roofs; they are at the present time little used for passenger cars. A TURTLE BACK ROOF, which see.

ARGAND BURNERS. FIGS. 2523, 2525. See, LAMP BURNERS and below.

ARGAND LAMP. A lamp invented by Argand, a native of Geneva, about the year 1784. The burner consists of

two concentric cylindrical tubes in which is the annular wick. The tube inclosing the wick is closed at the bottom and communicates by a pipe with the oil reservoir. The interior tube being open, free access of air is allowed to the interior and exterior of the flame, insuring more perfect and equal combustion.

ARGAND LAMP (Moehring). This lamp has certain improvements in the way of convenience for filling and for the use of a long wick.

ARM. See, BERTH ARM. SEAT ARM. GAS ARM. SEAT BACK ARM. LAMP ARM. STRIKER ARM.

ARM CAP. FIGS. 3260-64. A metal plate, wooden cap, or piece of upholstery with which the top of a seat end, arm rest or chair arm is covered. Those for chair arms, however, are also called CHAIR ARM PLATES, which see. An ARM REST, which see, is fixed to the side of the car.

ARM HOLDER (English). See, ARM SLING.

ARM PIVOT. See, SEAT ARM PIVOT.

ARM PLATE. See, SEAT ARM PLATE.

ARM REST. A wooden or metal bar or ledge attached to the side of a car, and not, like an arm cap, to the top of a seat end, for passengers to rest their arms on.

ARM REST BRACKET. See, ARM REST. A bracket supporting the arm rest.

ARM SLING (English). In a carriage, a padded ornamental leather strap, looped and secured to the doorway pillar. Also called arm holder or arm strap.

ARMATURE. FIGS. 4782, 4851; 4, FIGS. 4783-4815; 4891. The rotating part of a railway motor; consists of a laminated iron cylinder or core keyed to a shaft, and in slots of which are wound the armature coils of insulated copper wire or ribbon. At one end of the core on the shaft is mounted the commutator, a copper cylinder composed of insulated segments, which are connected to corresponding armature coils.

ARMORED BRAKE HOSE. Brake hose covered with a woven wire fabric, to protect it from injury or abrasion. Another form of armored brake hose is formed by winding a continuous wire spirally around it by a machine which makes the spiral slightly smaller than the tube, so that it grips it tightly. Vacuum brake hose, for vacuum brakes, is usually lined with coiled wires on the inside to prevent collapsing, but such is not termed armored brake hose.

ASPHALT CAR ROOFING. A saturated and coated felt applied in sheets.

ASBESTOS COCK (Consolidated Car Heating.) FIG. 2321. A cock packed with asbestos, with a drip connection which drains the opening when the cock is shut off. This allows the leakage to escape to the ground and avoids a freeze in the train pipe in cold weather.

ASBESTOS FELT. A preparation of asbestos in loose sheets similar to felt, for use as a non-conductor. It is largely used in refrigerator cars. It is manufactured for that purpose in rolls about 42 in. wide, and weighs about 1 lb. per square yard. It must be handled with care to prevent tearing.

ASBESTOS WICK (Pintsch Lamp). 299, FIGS. 2605-21.

ASCENDING RAIL (English). Nearest American equivalent, grab iron or hand rail. The end ascending rail is a long wrought iron bar secured at the ends of a covered vehicle, serving as a hand rail for ascending to the roof. The roof ascending rail, or roof commode handle, is a similar hand rail at the end of the roof of a covered vehicle.

ASCENDING STEP (English). Nearest American equivalent, ladder round. A roughed wrought iron plate secured to the ends of a covered vehicle serving as a step to ascend to the roof. They are used in England on both passenger and freight cars.

ASH PAN (Baker Heater). FIG. 2187.

ASH PIT. FIGS. 2186-87, 2190. The lower portion of every stove, under the grate, into which the ashes fall. Under it is sometimes placed an ashbox, FIG. 2187. The ash pit is made up of a casting usually called the ash pit base, and closed by an ash pit front carrying one, or more commonly two, ash pit doors. An ash pit ring serves as a hopper to guide the coal and ashes on to the grate. The doors are distinguished as right and left; as for a person standing facing the stove. The ash pit doors are sometimes carried as in FIG. 2186, in an ash pit frame instead of an ash pit front. Below are references to a few of the many such parts.

ASH PIT (Baker Heater). FIG. 2190.

ASH PIT DOOR (Baker Heater). FIGS. 2186, 2207.

ATMOSPHERIC BRAKE. See also, AIR BRAKE. VACUUM BRAKE.

ATTACHMENT OF COUPLERS TO CARS. FIGS. 4490-4506, 4537-50. See, DRAWBAR ATTACHMENTS, etc.

In 1893 a Recommended Practice was adopted for attaching M. C. B. automatic couplers to cars, as shown on Sheet B, and by a separate vote the use of a draft spring, 6¼ inches diameter, 8 inches long, with 2⅛ inches motion was recommended. At that time the capacity of the spring was placed at 22,000 pounds, but this was changed in 1896 to 19,000 pounds to better accord with the facts. See Proceedings 1893 and 1896.

In 1897 the yoke or pocket strap, shown in detail in FIGS. 4545-50, was adopted as standard of the Association, with the addition of ¼ inch radius at back end. This radius was changed to ⅝ inch in 1899.

In 1897 the buffer block and location, shown in FIGS. 4490-4506, but with some additional details of buffer block, were adopted as standard of the Association. See, FIGS. 4363-65.

AUTOMATIC AIR BRAKE. One which is automatically applied by breakage of a coupling, derailment, etc. The term is indefinite, but usually refers to the WESTINGHOUSE AUTOMATIC AIR BRAKE, FIGS. 891-958, which see, which is the one in most general use in this country.

AUTOMATIC CAR COUPLER. FIGS. 1299-1525. A coupler which will couple by impact without the necessity of a person going between the cars. The Master Car Builders' coupler is any coupler of the vertical plane type which conforms to certain contour lines adopted by the M. C. B. Association. This coupler is shown in FIGS. 4345-61, the contour lines in FIG. 4362. Recommended Practice in attaching couplers, 4490-4506, 4537-50.

This form of automatic coupler was adopted as standard in 1887 (see report for that year, pages 199-208, 243 and 253). Further details were adopted in 1889 and 1893. An action of the Association in 1889 permits the use of a coupler 28 ins. long instead of 30 ins., as shown, for use only on cars already in service and requiring such length drawbar. The carrier iron as shown for this coupler adopted in 1889.

The revision made in 1896 consisted in the elimination of the carrier iron from Sheet B of the Recommended Practice.

In 1899 the play of the shank of the coupler in the carry arm was changed to not less than ½ inch on each side. See letter ballot, 1899.

In 1899 the vertical dimension of the knuckle was fixed at 9 inches as a minimum.

In 1899 the vertical dimension of the end of guard arm was fixed at 7½ inches as a minimum.

In 1899 the recommendation of the Coupler Committee that the horizontal plane containing the axis of the shank of the coupler bisect the vertical dimensions of the knuckle and end of guard arm was adopted as a standard of the Association.

In 1899 the vertical height of the stop shoulder, or horn of coupler, was fixed at not less than 3½ inches.

In 1899 the recommendation of the Coupler Committee that the horn of the coupler be arranged to touch the striking plate before the back of the head of the

coupler strikes the ends of the draft timbers, was adopted as a standard of the Association.

In 1899 the sizes of pivot pins were fixed as follows: 1½ inches or 1⅝ inches in diameter and 13½ inches from the under side of head to center of pinhole for ⅜ inch cotter.

In 1901 a design of shank 5 by 7 inches back of the head was submitted, and, upon reference to letter ballot, was adopted as standard.

Standard contour line was announced by Executive Committee under instructions from the Association April 8, 1888. Limit gages for preserving standard contour line adopted in 1891.

These gages, properly proven by master gages, may be procured from Pratt & Whitney Company, of Hartford, Connecticut. A duplicate set of master gages is held in the office of the secretary for reference when desired.

In 1899 the contour lines showing the length of the guard arm was extended about 1 inch.

In 1899 the M. C. B. standard limit gage for new couplers was changed by moving the screw to a new position.

In 1902 the contour gage was strengthened by the use of a solid web in the weak part of the frame, and part of the outside flange increased to ¼ inch in thickness. The hand hold was also reduced in size to give greater strength.

Other types of couplers are shown, as follows:

AMERICAN, FIGS. 1454-63.
BROWN EMERGENCY KNUCKLE, FIG. 1396.
BUCKEYE, FIGS. 1407-20.
CALIFORNIA, FIGS. 1392-95.
CHICAGO, FIGS. 1464-72.
GOULD, FIGS. 1309-10, 1500-01.
HIEN, FIGS. 1434-40, 1503-04.
JANNEY, FIGS. 1380-91.
KELSO, FIGS. 1371-79.
LONE STAR, FIGS. 1401-03.
MAJOR, FIGS. 1421-33.
MONARCH, FIGS. 1441-53.
MUNTON, FIGS. 1473-82.
NATIONAL, FIGS. 1397-1400.
STANDARD, FIGS. 1299-1308, 1514-25.
TOWER, FIGS. 1311-70, 1505-13.
TROJAN, FIGS. 1483-99.
WASHBURN, FIGS. 1404-06, 1502.

AUTOMATIC CLOSET VENTILATOR. FIG. 3103. See, BELL'S EXHAUST HOPPER VENTILATOR.

AUTOMATIC COUPLING (Steam and Air Hose). FIGS. 880-90. A device by means of which the steam and air brakes and signal pipes are automatically coupled by impact. It is usually supported by a hanger from the coupler, and springs back of the head keep the parts tight together. Allowance is made for vertical and lateral movement, and arrangement provided for interchange with cars not equipped with the device.

AUTOMATIC DRAIN COCK (Air Brake). FIG. 974. See, DRAIN COCK.

AUTOMATIC LUBRICATOR. FIG. 979. A device for feeding at regular intervals a certain quantity of oil or lubricant to a cylinder or some mechanism requiring lubrication. See, LUBRICATOR.

AUTOMATIC REDUCING VALVE (High Speed Brakes). FIGS. 952-957. A valve attached to the brake cylinder to automatically bleed the pressure down to 60 lbs. after an emergency application, when the pressure in the cylinder rises to 85 lbs. or more. The triangular port gives a graduated reduction.

AUTOMATIC SWITCH (Gould Electric Light). FIGS. 2637, 2640. An automatic switch connected to the armature of the dynamo, by which the current is turned onto the lights and batteries when the armature has reached a predetermined speed of rotation and consequent voltage output.

AUTOMATIC VENTILATOR. FIGS. 3483-99. A ventilator which is self adjusting, so as to exhaust air from a car if the train runs in either direction. A great variety of such devices exists, not all shown. See, VENTILATOR, BELL'S EXHAUST HOPPER VENTILATOR.

AUTOMATIC WINDOW CATCH. A device to hold a window sash from being shoved up or down. See, SASH LOCK.

AUXILIARY ARCH BAR. 16, FIGS. 3735-3951. A wrought iron bar sometimes used, which forms the lower member of diamond truck side frame. In some cases such arch bars are made continuous by transverse pieces which extend across from one frame to the other under the transoms. See, ARCH BAR.

AUXILIARY BRAKE EQUALIZING LEVER (Six Wheel Truck). A short lever to which the brake lever connecting rod is fastened, and which divides the pressure equally between the center pair of wheels and the outside pair of wheels.

AUXILIARY BUFFER SPRING. A spring placed back of a draw spring to give greater resistance to compression on the drawbar in buffing. In this manner two springs operate in buffing, and only one in tension.

AUXILIARY COMPRESSION BEAM BRACE. 165b, FIGS. 343-48; 164b, FIGS. 360-72 and 385-87. See, CENTER COMPRESSION BEAM BRACE.

AUXILIARY RESERVOIR (Westinghouse Automatic Air Brake). FIGS. 933-35. A cylindrical reservoir made of boiler iron, attached to the under side of a car or tender by auxiliary reservoir bands attached through auxiliary reservoir beams. In freight cars, auxiliary reservoir beams are termed brake cylinder blocks and end blocks. The reservoir serves to hold a supply of compressed air to operate the brakes of each car, and is supplied from the main reservoir on the engine through the train pipe. For train service the auxiliary reservoir, triple valve and brake cylinder are combined in one piece, FIGS. 918-19.

AUXILIARY RESERVOIR BANDS (Air Brake). FIGS. 655-7. See above.

AUXILIARY RESERVOIR BEAMS (Air Brake). Short wooden timbers bolted to the under side of the sills. In freight cars called brake cylinder blocks. See above.

AUXILIARY RESERVOIR BLEEDING COCK. FIG. 932.

AUXILIARY RESERVOIR NIPPLE (Automatic Air Brake). FIG. 927. A short pipe by which the triple valve is connected with the auxiliary reservoir.

AXLE. 2, FIGS. 3735-3951. A shaft made of wrought iron or steel, to which a pair of wheels is attached by pressing on in a hydraulic wheel press. They are distinguished according to use, as passenger car, freight car, hand car, street car axle, etc., and according to mode of manufacture, as HAMMERED, FAGGOTED, MUCK BAR AXLES, etc., which see. See also, CAR AXLE. The M. C. B. standard axles are shown in FIGS. 4284-87. See HAMMERED CAR AXLE.

AXLE (M. C. B. Standard). In 1899 it was decided that the standard axles should be known by letters.

In 1901 a designation was given the standard axles, whereby each shall be known to carry a definite weight instead of for cars of particular capacity. See FIGS. 4284-87.

AXLE.—A. With journals 3¼ by 7 inches. Designed to carry 15,000 pounds. This axle is the standard of the Association for cars of 40,000 pounds capacity.

In 1873 a standard for car axle was recommended, the form and dimensions of which, excepting the diameter in the middle, were substantially the same as shown in this sheet. In 1884 the diameter at the middle was increased from 3⅞ inches to 4¼ inches, by letter ballot.

In 1901 the diameter of wheel seat was changed from 4⅞ to 5⅛ inches.

In 1901 a notation was added to the drawing of this axle showing a straight taper between certain points on the axle, also a diagram showing location of the borings to be taken from steel axles for analysis. See FIGS. 4434-55.

In 1902 further changes were made in the diameter of the tapered portion where it joins the fillet next to the rough collar; also in the diameter of the rough collar.

For action of the Association see Proceedings 1876, page 99; Proceedings 1878, page 129; Proceedings 1879, page 103; Proceedings 1880, page 130; Proceedings 1884, pages 156-162.

AXLE.—B. With Journals 4¼ by 8 inches. Designed to carry 22,000 pounds. This axle was adopted as a standard of the Association for cars of 60,000 pounds capacity, by letter ballot, in 1889. (See Proceedings 1889, pages 88-109.)

In 1901 the diameter of wheel seat was changed from 5⅜ inches to 5¾ inches.

In 1901 a notation was added to the drawing of this axle, showing a straight taper between certain points on the axle, also a diagram showing location of borings to be taken from steel axles for analysis. See FIGS. 4454-55.

In 1901 the diameter of the middle was increased from 4⅝ inches to 4¾ inches.

In 1902 changes were made in the diameter of the tapered portion of the axle where it joins the fillet next to collar.

AXLE.—C. With Journals, 5 by 9 inches. Designed to carry 31,000 pounds. This axle was adopted as Recommended Practice in 1896 and was made a standard of the Association in 1898.

In 1901 the diameter of wheel seat was changed from 6⅜ inches to 6½ inches.

In 1901 a notation was added to the drawing of this axle, showing a straight taper between certain points on the axle, also a diagram showing the location of borings to be taken from steel axles for analysis. See FIGS. 4454-55.

In 1902 changes were made in the diameter of the tapered portion of the axle where it joins the fillet next to collar; also in the diameter of the rough collar.

AXLE.—D. With Journals, 5½ by 10 inches. Designed to carry 38,000 pounds. This axle was adopted as a standard of the Association in 1899.

In 1901 the diameter of wheel seat was changed from 6⅞ inches to 7 inches.

In 1901 a notation was added to the drawing of this axle showing a straight taper between certain points on the axle, also a diagram showing the location of borings to be taken from steel axles for analysis. See FIGS. 4454-55.

In 1902 changes were made in the diameter of the tapered portion of the axle where it joins the fillet next to collar; also in the diameter of the rough collar.

AXLES (M. C. B. Recommended Practice for Specifications for Iron and Steel Axles). Specifications for Iron Axles:

In 1899 the following specifications, including tests for iron axles, were adopted as Recommended Practice:

Car axles for the use of this company will be ordered subject to the following conditions:

1. All axles must conform in shape and size to the dimensions shown on the blue prints, which will be furnished by the ..... R. R. Co.

2. All axles must be cut off and faced to exact lengths, and be centered with 60 degree centers in the manner indicated in blue prints, so as to prevent lathe centers from bottoming. Axles must be made of double-work fagoted scrap, 16 per cent. of new bar iron worked into the center of the axles being allowed if desired. Axles must be well hammered and free from any clearly defined open seams. They must finish in the lathe with journal free from flaws in the shape of holes, pieces shelled out, or open seams large enough so that with a knife blade scale or dirt can be removed from such seams, or open seams showing a clear opening of 1-32 inch or over, and being more than 1 inch long. The maker's name or initials must be stamped plainly on each axle.

3. All axles are to be inspected and tested at the works where they are made. The ..... shall be notified when they are ready for inspection. Under no circumstances shall car axles be shipped from the works where they are made until they have been tested, inspected and accepted by a proper representative of the company.

4. For each one hundred axles or fraction thereof ordered one additional axle must be furnished for test. This axle will be selected at random from the pile and subjected to the prescribed drop test for iron axles of its class. If it stands the test the one hundred axles, or fractional part thereof that it represents, will be inspected, and only those accepted that are made in a workmanlike manner and are free from defects mentioned in these specifications. All axles received are subject to rejection if they do not finish in the lathe in accordance with the requirements herein given. The manufacturer must furnish, free of charge, the axles that are to be tested, the testing apparatus and the assistance necessary to enable the inspector to make a satisfactory inspection and test. Axles will not be accepted if the diameters fall below the dimensions for forged sizes given in the blue prints, or if exceeding those dimensions by more than ⅛ inch. Car axles in the rough must not have less than the prescribed minimum weight, nor more than the prescribed maximum weight for axles of their class.

Axle Drop Test:

5. All axles will be tested physically by drop test. The testing machine must conform in its essential parts to the drawings adopted by the Master Car Builders' Association. These essential parts are: The points of supports on which the axle rests during tests must be three (3) feet apart from center to center; the tup must weigh 1,640 pounds; the anvil, which is supported on springs, must weigh 17,500 pounds; it must be free to move in a vertical direction; the springs upon which it rests must be twelve in number, of the kind described on drawing, and the radius of the supports and of the striking face on the tup in the direction of the axis of the axle must be five (5) inches. When an axle is tested it must be so placed in the machine that the tup will strike it midway between the ends, and it must be turned over after the first and third blows, and when required after the fifth blow. After the first blow the deflection of the axle under test will be measured in the manner specified below.

6. It is desired that the axles when tested as specified above shall stand the number of blows at the heights specified in the following table without rupture, and without exceeding, as the result of the first blow, the deflections given:

Axle—	No. Blows.	Height of Drop.	Deflection.
M. C. B. 4¼ by 8 inch journals	5	21½ ft.	7⅛ in
M. C. B. 5 by 9 inch journals	5	29 ft.	6 1-16 in
M. C. B. 5½ by 10 inch journals	5	36 ft.	5 7-16 in

7. Axles will be considered as having failed on drop test and will be rejected if they rupture or fracture in any way, or if the deflection resulting from the first blow exceeds the following:

M. C. B. axle, 4¼ by 8 inch journals.. 8⅛ inches
M. C. B. axle, 5 by 9 inch journals.... 8 1-16 inches
M. C. B. axle, 5½ by 10 inch journals.. 6 1-16 inches

In order to measure the deflection, prepare a straightedge as long as the axle by reinforcing it on

one side, equally at each end, so that when it is laid on the axles the reinforced parts will rest on the collars of the axle, and the balance of the straightedge not touch the axle at any place. Next place the axle in position for test, lay the straightedge on it, and measure the distance from the straightedge to the axle at the middle point of the latter. Then, after the first blow, place the straightedge on the now bent axle in the same manner as before, and measure the distance from it to that side of the axle next to the straightedge at the point farthest away from the latter. The difference of the two measurements is the deflection.

Specifications for Steel Axles. In 1899 the following specifications, including tests for steel axles, were adopted as Recommended Practice:

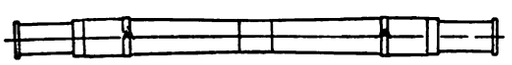
1. Axles will be ordered not less than 100 on one order. All axles must be made and finished in a workmanlike manner, and must be free from cracks, or seams, or flaws which can be detected by the eye. All parts must be rough turned, except at point "A" on diagram below.

2. All axles must be made of steel, and the material desired have the following composition:

Carbon	0.40 per cent
Manganese, not above	0.50 per cent
Silicon	0.05 per cent
Phosphorus, not above	0.05 per cent
Sulphur, not above	0.04 per cent

3. All axles must conform in sizes, shapes and limiting weights to the requirements given on the order or print sent with it. The rough turning must be done with a tool so shaped as to leave the surface free from ridges; and in centering them 60 degree centers must be used, with proper clearance for lathe centers. All axles must be legibly stamped when offered for test, on the unfinished portion, "A" on diagram below, with the blow or heat number and the date, and on the cylindrical portion at center they must be stamped with the name of the maker.

Portions marked "A" to be unfinished and to have stamped upon either of them blow number and date.



4. Manufacturers must notify ..... when they are ready to ship not less than 100 axles; must have all the axles made from each heat, and no others, in a pile by themselves; must furnish the testing machine referred to in Section 6, and the proper appliances for checking the dimensions and weights; must have a car or cars ready to receive shipment; must furnish the labor and power necessary to enable the inspector to promptly inspect and test; and ship or store the axles when tests are finished. Axles which, when offered for test, are so rusty as to hide defects will not be considered.

5. A shipment of axles being ready for test, the inspector will first make a list of the heat numbers in the various piles of axles offered, and the number of axles bearing the same heat number in each pile. If he finds in any pile axles bearing different heat numbers he must, before going further, have the pile rearranged, so that only those axles having the same heat number will be in the same pile. Also, if he finds in any pile any axles having evidence of changed or defaced heat numbers, or any axles having heat numbers not clearly legible, or any bearing heat numbers previously rejected, he will exclude such axles from further consideration. He will then examine the axles in each pile or heat, as to workmanship and defects visible to the eye, and as to whether they conform to dimensions and directions on the order, or tracing, or in these specifications. All axles not satisfactory in these respects must be laid aside and will not be further considered. This being done, if less than thirty axles in any heat are left, he will refuse to consider that heat further. If in this inspection defects are found which the manufacturer can remedy while the inspector is at the works, he may allow such defects to be cured and may count the axles which are successfully treated in this way as a part of the thirty above mentioned. Not less than thirty axles from any one heat having passed the foregoing inspection, the inspector will select from each pile or heat, one axle at random, and subject it to the physical test prescribed for such axles as may be under consideration. If the test axle fails to fill the physical requirements, all the axles from that heat of steel will be regarded as rejected, and none of them will at any time be considered again. If the test axle passes physical test the inspector will draw a straight line parallel with the axis of this test axle ten (10) inches long, starting from one end of it, and prick-punch this line at several points. He will then have a piece about six (6) inches long cut off from the same axle, so as to leave some of the prick-punch marks on each piece of the axle. The 6-inch piece must be sent at once properly tagged to ..... The piles of axles which have passed physical test will be allowed to remain as the inspector leaves them, until the results of the chemical test are known. The 6-inch piece being received at the laboratory, a line will be drawn from the prick-punch line above described, through the center of the axle across the cut-off end, and a prick-punch mark made on this last line, 40 per cent. of the distance from the center to the circumference of the axle. Borings for analysis will be taken by means of a 5/8-inch diameter drill, acting parallel to the axis of the axle, and starting with its center in the last described prick-punch mark. The borings will be analyzed in accordance with standard methods, and the results of analysis will be communicated to the inspector, who will at once proceed to the works, and reject, or accept and ship, or mark and store, as the case may be, the axles in question. If the analysis of any test axle shows that the steel does not meet the chemical requirements, all of the axles of that heat will be regarded as rejected, and none of them will at any time be considered again. If the analysis of any test axle shows that the steel meets the chemical requirements, all of the axles of that heat which have passed inspection and physical test will be regarded as accepted. The inspector will proceed to load and ship from the accepted axles as many as may be required to fill the order. If, as the result of inspection and the physical and chemical tests, more axles are accepted than the order calls for, such accepted axles in excess will be stamped by the inspector with his own name, and will then be piled and allowed to remain at the works, subject to further orders from the purchasing agent. On receipt of further orders, axles once accepted will, of course, not be subject to further test, but in no case will even accepted axles be loaded and shipped except in the presence of the inspector. In all cases the inspector will keep an accurate record of the heat numbers, of the number of axles in each heat which are rejected, or stored, and will transmit this information with each report.

6. All axles will be tested physically by drop test. The testing machine must conform in its essential parts to the drawings adopted by the Master Car Builders' Association. These essential parts are: The points of supports on which the axle rests during tests must be three feet apart from center to cen-

ter; the tup must weigh 1,640 pounds; the anvil, which is supported on springs, must weigh 17,500 pounds; it must be free to move in a vertical direction; the springs upon which it rests must be twelve in number, of the kind described on drawing; and the radius of supports and of the striking face on the tup in the direction of the axis of the axle must be five (5) inches. When an axle is tested it must be so placed in the machine that the tup will strike it midway between the ends, and it must be turned over after the first and third blows, and when required, after the fifth blow. After the first blow, the deflection of the axle under test will be measured in the manner specified below.

7. It is desired that the axles, when tested under the drop test as specified above, shall stand the number of blows at the height specified in the following table without rupture and without exceeding as the result of the first blow the deflections given:

Axle.	No. Blows.	Height. of Drop.	Deflection.
M. C. B. 4¼ by 8 inch journals for 60,000-pound cars	5	34 feet	7 inches
M. C. B. 5 by 9 inch journals for 80,000-pound cars	5	43 "	5¾ "
M. C. B. 5½ by 10 inch journals for 100,000-pound cars	7	43 "	4 "

8. Axles will be considered as having failed on physical test and will be rejected if they rupture or fracture in any way, or if the deflection resulting from the first blow exceeds the following:

M. C. B. axle, 4¼ by 8 inch journals.....7½ inches.
M. C. B. axle, 5 by 9 inch journals.....6¼ "
M. C. B. axle, 5½ by 10 inch journals...4½ "

9. Axles will be considered to have failed on chemical test and will be rejected if the analysis of the borings taken as above described gives figures for the various constituents below, outside the following limits, namely:

Carbon...below 0.35 per cent, or above 0.50 per cent.
Manganese ..... " 0.60 "
Phosphorus ..... " 0.07 "

In order to measure the deflection, prepare a straightedge as long as the axle, by reinforcing it on one side, equally at each end, so that when it is laid on the axle, the reinforced parts will rest on the collars of the axle, and the balance of the straightedge not touch the axle at any place. Next place the axle in position for test, lay the straightedge on it and measure the distance from the straightedge to the axle at the middle point of the latter. Then, after the first blow, place the straightedge on the now bent axle in the same manner as before, and measure the distance from it to that side of the axle next to the straightedge at the point farthest away from the latter. The difference in the two measurements is the deflection.

AXLE BOX (English). A JOURNAL BOX, which see. See, GREASE AXLE BOX, OIL AXLE BOX.

AXLE BOX COVER (English). A hinged movable cover on the axle box through which the lubricant is introduced. On English oil axle boxes the cover is generally bolted to the box, with a strip of leather interposed to make an oil tight joint. The oil is replenished monthly through a small orifice closed by a screw plug, or spring hinge.

AXLE BOX KEEP (English). The lower part of an axle box, which in an oil box contains the lubricant, and in a grease box simply protects the under side of the journal from dust.

AXLE COLLAR. FIGS. 4284-87. A rim or enlargement on the end of a car axle, which takes the end thrust of the journal bearing.

AXLE GAGES. Gages for fixing the lengths and diameters of an axle. Were at one time standards of M. C. B. Association.

AXLE GUARD. 1. (English). American equivalent, pedestal. The ordinary or W pattern consists of a wrought iron plate attached to the solebar, which permits vertical motion of the axle box, but restrains movement in any other direction.

2. Axle guard has been applied to the axle safety strap as at FIGS. 3849-50. It has also been applied to the safety beam, FIGS. 3823-24.

AXLE GUARD CROWN (English). The main part of the AXLE GUARD, which see.

AXLE GUARD CROWN WASHER (English). A piece of wrought iron plate, used as a washer for three or more bolts, which secure the main part of the axle guard to the sole bar.

AXLE GUARD KEEP, OR HORN STAY (English). A piece of iron which secures the lower end of the jaws of the axle guards together.

AXLE GUARD STAY ROD, OR AXLE GUARD STRETCHER (English). American equivalent, pedestal tie bar. A longitudinal rod connecting the lower ends of the axle guards, and keeping them at the right distance apart.

AXLE GUARD STRAP. See, AXLE GUARD SAFETY STRAP.

AXLE GUARD TRUSS. 60, FIGS. 3948-51. A wrought iron forged bar connecting the iron transoms of a six wheeled truck, and carrying the middle safety beam. It were better called the middle safety beam truss.

AXLE GUARD WING (English). The inclined part of an axle guard, strengthening it fore and aft.

AXLE GUARD WING WASHER (English). A piece of plate used as a washer for two or more bolts securing the wing of the axle guard to the sole bar. See, AXLE GUARD WING.

AXLE LIGHT SYSTEM OF LIGHTING. So called from the fact that the current is generated from a dynamo connected either directly or by belt to the car axle. Auxiliary storage batteries, which are charged while the train is running, supply current when the train is standing still or going slow. Automatic switches throw in the current for charging and cut the generator in and out. There are a number of systems in limited use, but the demand is growing rapidly. See, GOULD ELECTRIC CAR LIGHTING, FIGS. 2622-40.

AXLE PACKING. A DUST GUARD, which see. The journal packing is often called axle packing.

AXLE SAFETY BEARING (Passenger Car Trucks). 54, FIGS. 3781-3951. A bar of iron like an inverted letter U, or a block of wood bolted to the safety beam of a truck above the axle. The axle safety strap, 55, goes below it, the two parts together forming a circle around the axle. The axle safety bearing thimbles, 56, are used as distance pieces to hold both in their proper position.

AXLE SAFETY BEARING THIMBLES. 56, FIGS. 3781-3951. See above.

AXLE SAFETY STRAP. 55, FIGS. 3781-3951 and FIGS. 3849-50. See above.

AXLE SEAT. The hole in a car wheel which receives the axle. More properly, it is the inside surface of this hole which comes in contact with the axle, and not the hole itself. The corresponding part of an axle is called the wheel seat or wheel fit.

B

BABBITT METAL. "An alloy, consisting of 9 parts of tin and 1 of copper, used for journal boxes; so called from its inventor, Isaac Babbitt, of Boston. Some variations have been made, and among the published recipes are:

Copper	1	1
Antimony	1	5
Tin	10	50

Another recipe substitutes zinc for antimony.

The term is commonly applied to any white alloy for bearings, as distinguished from the box metal or brasses in which copper predominates."—Knight.

BABBITT METAL BEARING. A style of bearing of which a great variety of forms exist, which in effect substitutes babbitt metal in some of its many forms for brass as a bearing surface. LEAD LINED BEARINGS, which see, are different in that they merely use a thin sheet of lead over the brass, to correct slight irregularities and give an even bearing surface. The bearing or brass should be bored out to remove scale.

BABCOCK FIRE EXTINGUISHER. FIG. 2969. A device for causing the rapid generation of carbonic acid gas when desired by breaking a bottle of acid in the interior by means of the bottle breaking head (the handle projecting up in the center of the top of the apparatus). The solution within consists of about 2½ lbs. of bicarbonate of soda in about 6 gallons of water.

BACK (for a Pipe Clip). FIG. 2259. A metal strap sometimes used to attach the clips to, instead of attaching the latter directly to the surface to which the clip is attached.

BACK. See, SEAT BACK.

BACK ARM. See, SEAT ARM.

BACK BAND (Car Seat). 15, FIGS. 3151-52. The molding or metallic band that protects the top, bottom and side edges of a seat back. A seat back molding. FIGS. 3237-38, and 3268-79.

BACK CAP (Brake Valve). 102a, FIGS. 968-71.

BACK CYLINDER HEAD (Westinghouse and Other Brakes). 4, FIGS. 918-19. The cover for the end of a brake cylinder which has an opening in the center for the piston rod. For convenience of designation the end of the cylinder opposite to the piston rod is always called the front end, and that adjoining the piston rod the back end, as in locomotives.

BACK CYLINDER HEAD (Air Brake Cylinder). 4, FIGS. 917 and 975-77.

BACK FACE PLATE (Steel Tired Wheels). The inner one of the two plates connecting the tire with the hub. See, FRONT FACE PLATE.

BACK FACE PLATE. See, GOULD VESTIBULE.

BACK FRAME (Car Seat). 47, FIGS. 3151-52.

BACK GRAVITY BAR. See, GOULD VESTIBULE.

BACK GUY (Steam Shovel). 15, FIGS. 357-59.

BACK SEAT BOTTOM RAIL (Longitudinal Seat). A horizontal wooden strip at the back edge, to which a wooden seat bottom is attached. See also, FRONT SEAT BOTTOM RAIL.

BACK SEAT RAIL (Street Car Seats). A longitudinal strip of wood which extends along the back edge, and is fastened to the window posts.

BACK SEAT RAIL (English). In a carriage, a small transverse wooden bar secured to the partition and supporting the seat boards.

BACK SQUAB (English). American equivalent, seat back. In a carriage, that part of the seat which fits the small of the passenger's back, and also supports the head and a fixed back, covered with broadcloth and stuffed with curled hair, and also made elastic by springs.

BACK SQUAB SOFA SPRINGS (English). Analogous to the American back springs. One end of these springs butts against the partition and the other against a sheet of stout canvas, the back squab resting against the latter.

BACK STOP TIMBERS. Short sub-sills bolted and keyed by packing blocks to the center sills of a car in line with the draft timbers, to assist the draft or center sills in transmitting the buffing shocks and strains. Usually called a buffing sub-sill.

BAGGAGE CAR. FIGS. 375-77. A car for carrying the baggage of passengers. A combination baggage car, FIG. 120, is one having compartments set off for express or mail, or both. A combination car or coach, FIGS. 74, 134, etc., is a passenger car with a baggage compartment. A PUSH BAGGAGE CAR, which see, is a light car for use at stations.

BAGGAGE TRUCK. See, BAGGAGE WAGON TRUCK.

BAGGAGE WAGON TRUCK. A four wheeled vehicle with a frame or rack for carrying baggage, used to move the latter by hand about railroad stations. A two wheeled vehicle is a baggage barrow.

BAIL. A curved handle of a more or less semicircular form for a pail, bucket, lantern or other utensil. As applied to lanterns, FIGS. 2728-37.

BAKER CAR HEATER. FIGS. 2180-2287. A stove invented and patented by Mr. Wm. C. Baker for warming cars. It is arranged so as to heat water in a coil of pipe in the inside of the stove, and cause it to circulate through a series of pipes laid near the floor of the car. The original heater has undergone many changes, and only those forms are shown that are in current use. They are: The Single Coil Fireproof, FIGS. 2180-99; the Two Coil Fireproof, FIGS. 2200-20; the Perfected, FIGS. 2221-39, and the Mighty Midget, FIGS. 2240-52, with the parts belonging to them.

BALANCE SPRING (Passenger Truck Brake Gear). FIGS. 3862-4, 3912-7. A flat spring from which the adjusting hanger is suspended and which keeps the brake head balanced in its proper position.

BALANCE VALVE PRESSURE REGULATOR. FIG. 2345. A valve for automatically regulating the pressure in the steam pipes in a car heating system.

BALL BEARING BUTT HINGE. FIGS. 1949-52. A butt hinge, the washer of which is a ball bearing.

BALL BEARING JACK. FIGS. 2972-77. See, NORTON'S BALL BEARING JACK.

BALL BEARING SIDE BEARING AND CENTER PLATE. FIGS. 4130-37. See, NORWOOD BALL BEARING SIDE BEARING.

BALLAST CAR. FIGS. 43, 41-48. A dump car for hauling and distributing ballast. See, RODGER BALLAST CAR. GOODWIN CAR. GRAVEL CAR.

BALLAST PLOW. See, RODGER BALLAST CAR AND PLOW.

BALLAST WAGON (English). American equivalent, gravel car. A four wheeled gondola car, fitted with falling doors at the sides and ends, and used for conveying ballast, rails and ties.

BAND (for Seat Backs). FIGS. 3268-79. More properly SEAT BACK MOLDING, which see.

BAR LIFT. See, BAR SASH LIFT.

BAR SASH LIFT. FIGS. 3699-3703. A sash lift having a short horizontal metal bar attached to two flanged studs or stanchions; used for the large sashes of sleeping and parlor cars.

BAR SHACKLE (of a Padlock). A rectangular, instead of U-shaped, shackle.

BARBER ROLLER SIDE BEARING. FIGS. 3735-37. See, ROLLER SIDE BEARING TRUCK.

BARR VESTIBULES. Two types of vestibules designed by Mr. J. N. Barr, which are called the wing vestibule and the toggle vestibule, now little used.

BARREL CAR. FIG. 14. A flat car, racked so as to carry many empty barrels. They are made long, and the racks are very high in order to make up a carload weight.

BARREL DOOR BOLT. FIGS. 1889-98. A door bolt made of a round metal bar and held on its slide in a round tube or "barrel." It is constructed so that when it is either engaged or disengaged from its keeper it can be turned by a short lever or knob and held in either position by suitable stops.

BARREL SEAT LOCK. FIGS. 3294-98. See, SEAT LOCK.

BARRETT'S DOUBLE ACTING LEVER AND RACK JACK. FIGS. 2983-84. A jack for track work consisting of a rack with sharp teeth, into which pawls engage as the lever is worked up and down. It is double acting; that is, the load is lifted when the handle is lifted or thrust down.

BARROW TRUCK. This term has been used to designate two wheeled vehicles used about railroads for moving freight and baggage by hand; but the more usual practice is to speak of BAGGAGE BARROWS and FREIGHT TRUCKS, which see, although both are sometimes designated as barrow trucks.

BASE BOARD CORNER MOLDING. A light molding at the junction of the base board and the floor.

BASE PLATE (of a Derrick or Crane). A large plate placed on the floor of the car for supporting the mast. Another method is by a MAST POCKET, which see.

BASE WASHER (Passenger Car Platform Posts). 40, FIGS. 388-91. A metal ring or plate, which forms a bearing for the post on the platform end timber.

BASIN. 1, FIGS. 2798-2800. A hollow vessel made of porcelain or metal, and in cars usually fixed in a suitable stand with pipes and other attachments for filling it with water and emptying it. Such basins are used as lavatories in sleeping and other passenger cars. They are emptied at the bottom through a pipe connected to the basin by a basin coupling, or basin bushing, which is closed by a basin plug. The basin plug is attached to a basin chain, which again is fastened to a stanchion called the basin chain holder.

BASIN CHAIN. See, BASIN.

BASIN CHAIN HOLDER. FIG. 2770. See, BASIN. Frequently called a basin chain post, or basin chain stay.

BASIN COUPLINGS. FIGS. 2749-55. See, BASIN.

BASIN PLUG. FIGS. 2750-51. See, BASIN.

BASIN PUMP. A pump of peculiar construction for supplying the basin of sleeping and parlor cars from the tank carried under the slab. It is called single or double acting, according as the upward stroke only, or both the upward and downward strokes, eject water. Double acting most used. The use of basin pumps has been practically discontinued on sleeping cars, the water being carried in tanks under the car and forced through the pipes by compressed air. See, PULLMAN WATER SUPPLY.

BASIN VALVE. 5, FIGS. 2798-2800.

BASKET RACK (English, Parcel Net). FIGS. 2987-3012; 145, FIGS. 388-91, etc. A receptacle made of cast metal ends, rods, or a combination of rods and wire netting for holding parcels. They are attached to the sides of passenger cars, above the heads of the passengers, so as to be out of the way. Continuous basket racks extend the full length of the car, and are increasing in favor. One is shown in A, FIGS. 388-91. Parlor cars usually have no basket rack, but sometimes package racks are placed between the windows. Basket racks are sometimes called bundle racks.

BASKET RACK BRACKET. 18, FIG. 1782 and FIGS. 3013-16. A light metal or wooden support for the end or center of a basket rack.

BASKET RACK NETTING. FIGS. 3002-03. Wire or silk netting with very large meshes, which forms the bottom or back of a basket rack.

BASKET RACK ROD. FIGS. 3002-03. A small round metal bar which forms the main portion of a basket rack, and to which the netting, when used, is fastened.

BASKET RACK TIP. FIGS. 3002-03. An ornamental knob or acorn on the end of a basket rack rod.

BASTARD HOWE (Freight Car Framing). FIGS. 164-65, 166-67, etc. A style of framing having the vertical rods and inclined posts like the familiar Howe truss, but having also an upright post connected with the rod and serving more or less as a part of the truss. The Howe truss proper has been used in freight car construction to a limited extent.

BASTARD PRATT FRAMING. Is a similar modification of the Pratt bridge truss, which differs from the Howe in having vertical posts instead of rods, and inclined rods instead of braces. A combination truss embodying the essential features of both the Howe and Pratt trusses is quite common in new construction.

BATTEN. "A piece of board or scantling of a few inches in breadth."—Webster.

BATTEN WAGON. (English). A four wheeled flat car about 24 feet long, fitted to carry sawed timber about 23 feet long, termed battens.

BAYONET CATCH. A general term derived from the manner of fastening on a bayonet to a gun, applied to the mode used in many forms of hardware and mechanical construction for connecting separate parts so as to be firmly united and yet easily removable. Many lamps are held in place by a form of bayonet catch.

BAY WINDOW PARLOR CAR. A style of parlor car construction designed to give more variety to the interior and improve the line of vision of the passenger. No longer used in new construction.

BEAD. "A small salient molding of semi-circular section. Also the strips on the sash frame which form a guide for the sash. These beads are known as the inside bead, outside bead and parting bead."—Knight.

In car construction the place of the inside bead is taken by the window casing, or inside window stop; the place of the outside bead by the outside window stop, and of the parting bead by the sash parting strip, or stop bead. The term is also frequently applied to any form of small, light molding of simple outline. See, MOLDING and STOP BEAD.

BEAD MOLDING (English). See, BEAD and PLANTED MOLDING.

BEAM. "The term beam is generally applied to any piece of material of considerable scantling, whether subject to transverse strain or not; as, for example, 'collar beam,' 'tie beam,' 'Brestsummer beam,' the two former being subject to longitudinal strains of compression and tension, respectively, and the latter to transverse strain."—Stoney.

1. "Any large piece of timber, large in proportion to its thickness and squared or hewed for use."—Webster.

2. A bar of metal of similar proportions is also called a beam.

3. "A bar supported at two points and loaded in a direction perpendicular or oblique to its length is called a beam."—Rankine.

By analogy the term has of late years come to be applied to similar pieces or bars of iron. Thus we have iron I-BEAMS and DECK BEAMS (which see), to take the place of wooden beams in buildings. The term is also used to designate such things as the beam of a balance or scales, a plow beam, the walking beam of a steam engine, brake beam, etc.

BEARING. That which supports or rests on something, and is in contact with it. Thus a block or stone on which the end of a timber rests is called a bearing. The metal block or bushing in contact with a journal is called a bearing.

For M. C. B. Standard Journal Bearing see FIGS. 4238-83, etc. See,

AXLE SAFETY BEARING.
BODY TRUSS ROD BEARING.
BRAKE HANGER BEARING.
BRAKE SHAFT BEARING.
CENTER BEARING.
CRANK SHAFT BEARING.
CUP SIDE BEARING.
DUST GUARD BEARING.
ROCKER BEARING.
ROCKER SIDE BEARING.
SAFETY BEAM TRUSS ROD BEARING.
SIDE BEARING.
SPRING PLANK BEARING.
STOP KEY JOURNAL BEARING.
STOP JOURNAL BEARING.

HALF ELLIPTIC SPRING BEARING.
JOURNAL BEARING.
LEAD LINED JOURNAL BEARING.
LEVER SHAFT BEARING.
LOWER BRAKE SHAFT BEARING.
SWING HANGER PIVOT BEARING.
TRUCK BOLSTER TRUSS ROD BEARING.
TRUCK SIDE BEARING.
TRUSS ROD BEARING.
UPPER BRAKE SHAFT BEARING.

BEARING CASTING (Tip Cars). A casting, one of a pair attached to either the car body or to the truck which supports the car body and its loads. In tip cars it is pivoted or hinged so as to permit the body to tip or rock laterally and to thus discharge its load.

BEARING SPRING. An occasional but not the conventional term for the bolster springs or main springs of the car.

BEARING SPRING (English). American equivalent, bolster spring. The spring which carries the weight of the vehicle and rests on the axle box. In English practice, almost invariably a half-elliptic spring.

BEARING SPRING BUCKLE (English). An American equivalent, spring band. A solid wrought iron strap which confines the plates of the bearing spring, and is generally provided with lugs on the lower side so that it cannot be moved transversely or longitudinally on the axle box. The plates are secured to the buckle by a ⅜-in. vertical rivet.

BEARING SPRING SHOE (English). A cast iron lipped rubbing piece, secured to the under side of the sole bar, on which the ends of the bearing spring bear.

"BEE" DOOR SPRING. FIG. 2147. See, DOOR SPRING.

BELL. See, RECORDING BELL. SIGNAL BELL. SMOKE BELL, etc.

BELL CORD. FIG. 1828. Originally a rope, one end of which is attached to a signal bell on the engine, and which extends through or along the tops of the cars the whole length of the train, and is used for signaling to the locomotive engineman. It is carried by various forms of BELL CORD BUSHINGS, BELL CORD HANGERS, and BELL CORD GUIDES (which see). In passenger trains it is attached to the raftetrs or purlins by suitable supports on the inside of the cars. On passenger trains, the bell cord is made of lengths equal to that of each car, and is fastened together with suitable couplings. Bell cord is made of flax, hemp, and sometimes of leather, and is known by the following names in trade: Brass wire covered, fancy braided, flaxen, Italian hemp, solid leather, solid braided. The usual sizes are ¼ in. and 9-32 in. diameter. Since the introduction of the air signal system the bell cord in each car is separate and not carried through the train. One end is attached to the car discharge valve and a pull on the cord releases the air in the signal pipe and blows the signal in the engine cab.

BELL CORD BEVELED BUSHING. FIGS. 1814-15. See, BELL CORD BUSHING.

BELL CORD BUSHING. FIGS. 1810-19. A thimble lining a hole through a partition for a bell cord to pass through; in distinction from a bell cord guide, which is attached to the side or roof of the car or to a bell cord hanger and serves solely the purpose which its name implies. For passing the bell cord through inclined surfaces beveled bushings are used, which are frequently provided with one or more pulleys to avoid friction.

BELL CORD CHAIN HANGER. FIGS. 1871-72, 1880.

BELL CORD COUPLING. FIGS. 1820-27. The hook attached to the end of a bell cord to enable it to be connected or disconnected at pleasure with another bell cord; not to be confused with a bell cord splice, FIG. 1822, which is intended as a permanent connection.

BELL CORD END HOOK. A common metal hook with a screw shank by which it is attached to the end of the car. The hook is used to fasten the end of a bell cord to the last car and thus hold it in its place and prevent it from being drawn out of its guides.

BELL CORD GUIDE. FIGS. 1830-1856. A metal eye or ring attached to the roof or ceiling of a car, or to the end of a BELL CORD HANGER (which see), and by which a bell cord is carried or conducted. According to their method of attachment to the car they are designated as bell cord guides, with flange, or with screw, or with screw and flange, and they are often provided with one or more pulleys, and are sometimes swiveled when the bell cord is to be conducted in an oblique line. The pulleys are ordinarily at the bottom, but sometimes at the side of the bell cord guide, according to the direction of probable strain. Certain tubelike forms of bell cord guides are occasionally miscalled BELL CORD BUSHINGS, which see.

BELL CORD GUIDE WASHER. An ornamental washer for making a finish for a bell cord guide where it is attached to a car roof.

BELL CORD HANGER. FIGS. 1857-80. A guide for the bell cord, hanging usually from the center of the clear story or upper deck. In its original form it consists of a bell cord strap, attached to a bell cord strap hanger bracket, which latter is screwed to the top of the car. The simpler forms of these brackets, as FIGS. 1873-75, are called screw tops. The lower end of the strap carries a ring called the bell cord guide, which latter is often provided with a pulley at the bottom to obviate friction. To avoid unpleasant vibration, the double strap hanger has been used, giving lateral stability, and recently BELL CORD ROD HANGERS, FIGS. 1873-79, have been introduced, swinging on a pivot. BELL CORD FIXED HANGERS, FIG. 1868, are used where the drop is small.

BELL CORD HANGER STRAPS. FIGS. 1881-88. See, BELL CORD HANGER.

BELL CORD HANGER BRACKET, OR SCREW TOP. FIGS. 1859-60; 1873-74. See, BELL CORD HANGER.

BELL CORD PULLEY, OR SHEAVE. FIGS. 1837-47. A wheel in a bell cord guide over which a bell cord runs.

BELL CORD ROD HANGER. FIGS. 1873-76. See, BELL CORD HANGER.

BELL CORD SHEAVE. A BELL CORD PULLEY, which see.

BELL CORD SPLICE. FIG. 1822. A metal coupling with right and left hand screws for permanently splicing the ends of a broken bell cord. See, BELL CORD COUPLING.

BELL CORD STRAP. FIGS. 1881-88. See, BELL CORD HANGER.

BELL CORD STRAP HANGER. FIGS. 1881-88. See, BELL CORD HANGER.

BELL CORD STRAP HANGER BRACKET. FIGS. 1857-64. See, BELL CORD HANGER.

BELL CORD STRAP HANGER SCREW TOP. FIGS. 1859-60, 1873-74. See, BELL CORD HANGER.

BELL CORD THIMBLE. A BELL CORD BUSHING, which see.

BELL CRANK. An L-shaped rectangular lever, often with the two extremities connected so as to be of triangular form, for changing the direction of motion by 90 degrees, more or less.

BELL CRANK (Hand Car). 23, FIGS. 4722-27. A crank attached to the propelling lever shaft, giving more favorable direction to the power applied to the levers.

BELL ROPE. A BELL CORD, which see.

BELL'S EXHAUST HOPPER VENTILATOR. FIG. 3103. An attachment placed underneath the floor pipe of a closet hopper, on the under side of a passenger car, to produce a downward draft through the hopper when the car is in motion. The attachment is of a concave conical form, which by the motion of the train in either direction causes the air to pass downward through the floor pipe by creating a partial vacuum at the base.

BELT MOLDING. A molding passing entirely around the interior of the passenger car directly above the windows, in the middle of the wide board called the inside lining.

BELT RAIL. 49, FIGS. 159-169, etc.; 65, FIGS. 360-72, 385-87, 388-91. A part of the framing of a passenger or street

car frame below the windows on the outside, extending the whole length of the car body and attached to each post. It is usually framed into the posts and supports the window sills. The term is often applied to the girth of a box car. The UPPER BELT RAIL, 82, FIGS. 360-72, is a similar strip directly above the window.

BELT RAIL BAND (Street Cars). An iron band on the outside of a belt rail covering the joint of the latter with the panel. It extends around each corner of the car to the door posts.

BELT RAIL CAP. 81, FIGS. 385-87. A thin strip of wood nailed to the top of a belt rail, and which forms a seat for the window sill.

BENCH CAP. Transverse timbers resting upon the side rails of a coal or ore car, to tie the rails together and prevent spreading, and also to support the doors or winding shaft about which the winding shaft chain is wound.

BEND (Iron Pipes). FIG. 2275, etc. See, RETURN BEND. They are distinguished as close and open return bends.

BENT LADDER ROUND. The lower round of the ladder of box cars, having an angle turned up at the inside for the safety of trainmen, to prevent the foot slipping off the ladder round. The use of such rounds has been recommended by the M. C. B. Association. See, LADDER and LADDER ROUND.

BERTH. 1, 2, FIGS. 1778-80, 1783. A bed in a SLEEPING CAR, which see; also, the shelf or support on which the bed rests. There are two such beds in the space occupied by two double seats, which is called a section. The lower berth is made upon the seats and the upper one on a shelf, which can be raised or folded up out of the way in daytime, as shown in FIG. 1780. A full section with both the upper and lower berths made up is shown in FIG. 1780. See, LOWER BERTH. UPPER BERTH.

BERTH ARM. A BERTH BRACE, which see.

BERTH BOLT. See, BERTH LATCH BOLT.

BERTH BRACE. A metal rod, chain, or wire rope sometimes attached to the side and near the top of a sleeping car, and at the other end to the outer edge of a berth, which is supported by the brace. In the later designs it is done away with, the berth being supported by the berth chain.

BERTH BRACE EYE. A metal plate with suitable lugs for fastening the brace to the top of the car or to the berth.

BERTH BRACKET. FIG. 3395. A bracket on which an upper berth of a sleeping car rests when lowered and the bed is made and in use.

BERTH CATCH AND PLATE. FIGS. 3383-84.

BERTH CHAIN. 25, FIGS. 1778-83; C, FIGS. 3428-32. A pitch chain passing from the berth spring through the overhead pulley and to the corner of the upper berth to support it. The berth spring is attached to the chain to counteract the weight of the berth. The berth chain does the service of the berth spring rope and berth brace.

BERTH CHAIN END PLATE. See, BERTH SPRING LUG.

BERTH CHAIN PULLEY. 24, FIGS. 1778-83. L, FIGS. 3428-32. A pulley attached to the roof of a sleeping car, over which a berth chain runs.

BERTH CURTAIN. 17, FIGS. 1778-83. A curtain hung in front of a sleeping car section to hide the occupants from sight. A single curtain covers both berths, and is hung from the berth curtain rod.

BERTH CURTAIN HOOK. FIGS. 3441-42. A metal hook attached to a berth curtain, and by which the latter is hung on a rod above the berths; usually covered with leather to prevent rattling.

BERTH CURTAIN POLE. See, BERTH CURTAIN ROD.

BERTH CURTAIN ROD. 16, FIGS. 1778-83. A rod usually made of metal tubing, fastened above a section of a sleeping car and to which a berth curtain is hung. They are now made in sections, supportetd by folding brackets, and swing into the upper berth out of sight, except when berths are made up. See, BERTH CURTAIN ROD BRACKET.

BERTH CURTAIN ROD ACORN. See, BERTH CURTAIN ROD TIP.

BERTH CURTAIN ROD BOLT. A small vertical bolt, usually tipped with an acorn, fastening the curtain rod in the coupling on the bracket.

BERTH CURTAIN ROD BRACKET. 15, FIGS. 1778-80, and FIGS. 3463-69. A metal bracket attached to the deck side of a sleeping car, which forms a support for a berth curtain rod. Such brackets usually have a coat and hat hook attached to them. A hanger, FIG. 3469, is sometimes used as a substitute for a bracket at certain points. The stationary bracket has been replaced by the folding curtain rod bracket, which folds, with the rod attached, into the upper berth and out of sight when the curtains are not in use. See, CURTAIN ROD FOLDING BRACKET.

BERTH CURTAIN ROD COUPLING. A fastening by which a berth curtain rod of a sleeping car is secured to a bracket. It usually consists of a bolt or screw.

BERTH CURTAIN ROD HANGER. FIG. 3469. See, BERTH CURTAIN ROD.

BERTH CURTAIN ROD SOCKET. FIG. 3469. A metal flanged ring which is fastened to some part of a sleeping car to carry the berth curtain rod, also called berth curtain rod bushing.

BERTH CURTAIN ROD TIP, OR ACORN. See, ACORN.

BERTH EXTENSION ARMS. FIG. 3388.

BERTH FIXTURES, Etc. FIGS. 3376-3469.

BERTH FRONT. 4, 5, FIGS. 1778-83. The bottom of the upper berth when it is down. There are two parts, the upper part and the lower part, which is next to the car side. The berth front panel is between the two berth fronts.

BERTH FRONT BORDERS AND CORNERS. FIGS. 3333-38.

BERTH FRONT PANEL. 6, FIGS. 1778-83. The panel in the bottom of the upper berth between the two berth fronts.

BERTH HANDLE. A BERTH LATCH HANDLE, which see.

BERTH HEADBOARD. 9, FIGS. 1778-80. See, HEADBOARD.

BERTH HEAD REST PIVOT AND PLATE. FIGS. 3398-99.

BERTH HINGE. FIGS. 3418-21. A hinge or joint by which the back edge of an upper berth of a sleeping car is attached to the side of a car. They are distinguished as loose and fast. Fast hinge is shown in FIG. 3418. The loose hinge fits in a plate or bushing. Shown with the hinges.

BERTH HINGE BUSHING. A hollow metal socket in which the spindle of a loose berth hinge works.

BERTH HINGE PLATE. FIG. 3422. A plate which takes the place of a berth hinge bushing.

BERTH LAMPS. FIGS. 3449-52. Electric lamps for the berths of sleeping cars. The Gibbs lamp is fixed in the partition between two berths, and the one lamp may light two berths, there being a metallic cover or slide which shuts it off at any time from either side of the partition.

BERTH LATCH. 47 and 48, FIGS. 1778-83 and FIGS. 3426-27. A spring bolt for holding the upper berth of a sleeping car up in its place when not in use. To obviate the danger of the berth shutting up in case of overturning of the car, the safety berth rope and attachments, 26, FIGS. 1778-83, are used. Safety berth latches have also been used to obviate the necessity of using a safety rope. See, SAFETY BERTH LATCH.

BERTH LATCH BOLT. 48, FIGS. 1778-80. A bar or pin of a berth latch which engages in a corresponding strike plate or keeper to hold the berth up.

BERTH LATCH FACE PLATE. FIGS. 3434-38.

BERTH LATCH HANDLE. FIGS. 3434-38.

BERTH LATCH KEEPER. Also called STRIKE PLATE, which see. See, BERTH LATCH BOLT.

BERTH LATCH LEVER. The part by which the berth latch handle operates the berth latch bolt; also called a berth latch rocker plate.

BERTH LATCH (or Lock) PLATE AND BOLT. FIGS. 3393-94.

BERTH LATCH ROCKER PLATE. See, BERTH LATCH LEVER.

BERTH LATCH (or Lock) RODS. FIG. 3433.

BERTH LATCH SHELL. A metal covering made in the form of a sea shell for covering and protecting the handle of a berth latch in a sleeping car.

BERTH LOCK. A BERTH LATCH, which see.

BERTH MATTRESS. 18, FIGS. 1778-83. The mattresses which cover the seat cushions of the lower berth and the springs of the upper berth. When the berths are made up for day travel the mattresses are stored in the upper berth, as shown in the figure.

BERTH NUMBERS. FIGS. 3444-48. Figures or numbers, usually made of metal or porcelain, for numbering the berths or sections of sleeping cars. They are frequently sewed to plush panels and hung from the berth curtain rods.

BERTH or BUNK PARTITION. 8, FIGS. 1778-83. The partition between the upper berths of two adjacent sleeping sections. It is of the same outline as the upper berth's cross section.

BERTH PIVOT. FIG. 3397.

BERTH PIVOT SOCKET. FIGS. 3376-80.

BERTH RATTLE STOP. FIGS. 3400-01.

BERTH REST. See, UPPER BERTH REST.

BERTH SAFETY LATCH HANDLE, in place attached to car. 47, FIGS. 1778-80. See, SAFETY BERTH LATCH.

BERTH SAFETY ROPE. 26, FIGS. 1778-83 and FIG. 3425. A wire rope fastening the upper berth of a sleeping car to the fixed arms of the lower berth, to prevent accidental closing up of the upper berth in case of overturning of the car. The rope is fastened to the upper berth by a berth safety rope fastener and to the lower berth by inserting a knob into a berth safety rope holder.

BERTH SAFETY ROPE FASTENER. See, BERTH SAFETY ROPE.

BERTH SAFETY ROPE HOLDER. See, BERTH SAFETY ROPE.

BERTH SAFETY ROPE HOOK. FIG. 3443.

BERTH SAFETY ROPE KNOB. See, BERTH SAFETY ROPE HOLDER.

BERTH SPRING. 23, FIGS. 1778-83, FIG. 3432. A spring usually made in a spiral form, like a watch spring, coiled within a device called the berth spring fusee and attached to the upper berth of a sleeping car by a berth chain so as to counteract the weight of the latter and make it easy to raise and lower it.

BERTH SPRING FRAME. 23, FIGS. 1778-80 and FIG. 3432. A metal support which holds a berth spring and fusee.

BERTH SPRING FUSEE. See, FUSEE.

BERTH SPRING LUG, or CLIP. M, FIG. 3432. The means by which the end of a berth chain is fastened to the upper berth, sometimes called a berth chain end plate.

BERTH STRIKER PLATE. A BERTH LATCH KEEPER, which see.

BETTENDORF BOLSTER. FIGS. 795-98. Body and truck bolsters made of I beams having their webs compressed to give the necessary reduction in height at the ends. The two beams are placed side by side and tied together with end plates, the side bearing castings and center plates.

BETTENDORF FRAME. FIGS. 251-54. A metal underframe for freight cars, built up of structural steel shapes, pressed and formed into the shapes as used in the car.

BEVELED BUSHING. FIG. 1814. See, BELL CORD BUSHING.

BEVELED WASHER. FIGS. 487-88. A washer used to give an even bearing for rods which stand at an acute angle to the surface on which the nut or bolt head bears. Sometimes two such washers which come near together are cast in one piece, and are then called double beveled washers. See, TRIANGULAR WASHER.

BEZEL. "A term applied by watchmakers and jewelers to the groove and projecting flange or lip by which the crystal of a watch is retained in its setting. An ouch." —Knight. Hence, Globe Bezel (Pintsch Gas Burner). 307, FIGS. 2605-2.

BIBB. A curved nozzle for conveying liquids and changing the direction of their flow, usually from a horizontal to a vertical current. Hence—

BIBB COCK. FIGS. 2765-66. Literally, a cock with a curved nozzle or spout, but commonly restricted to a cock with a plain valve without springs, moved by the hand only.

BILLET CAR. FIGS. 266-67. A low side gondola of steel throughout for transportation of hot steel billets or other heavy material.

BIT (of a Key). The part of a key which enters the lock and acts upon the bolt and tumblers. The bit consists of the web and wards. The web is the portion left after the wards are cut out. The wards (of a key) consequently are those parts of the bit which are not there and fit over the WARDS of a lock, which see. Some bits have no wards.

BLAKE BUTT. An indefinite term, meaning in general a plain cast iron butt hinge, having a washer, but no acorns or screw pin.

BLANK HINGE. A hinge which permits the door to swing open in either direction. It is intended as a substitute for one of a pair of DOUBLE ACTING SPRING HINGES, which see, as being lighter and cheaper.

BLEEDING COCK. A small cock on the auxiliary reservoir, etc. Generally called a drain cock.

BLEEDING VALVE OR BLEEDING COCK. Another term for release valve or release cock. The operation of releasing the brake when applied upon a car detached from the locomotive is sometimes called bleeding. The bleeding valve is located in the auxiliary reservoir, and the brakes may be released by opening it.

BLIND. A WINDOW BLIND, which see. They are sometimes single, but usually double, and then distinguished as lower and upper. Flexible window blinds are rarely met now, having been displaced by window shades.

BLIND CEILING. (Refrigerator Car). L, FIGS. 185-95. A layer of light boards next above the inside ceiling in the roof of the car.

BLIND FLOOR (Refrigerator Cars). I, FIGS. 185-95. A layer of boards under the sub-floor and fastened to nailing strips secured to the bottom of the sills.

BLIND LIFTS, BUSHING, BOLT, Etc. FIGS. 3575-3620. See, WINDOW BLIND LIFT, etc.

BLIND LINING (Refrigerator Cars). E, FIGS. 185-95. A lining between the outside sheathing and the inside lining; also called intermediate lining, 53a, FIGS. 185-95.

BLISS FOLDING PLATFORM GATE. FIGS. 1803-04. A metal gate for platforms of railroad and street cars which has a joint in the middle and which folds together when opened, and does not occupy much space.

BLOCK. 1. "A heavy piece of timber or wood, usually with one plane surface; or it is rectangular and rather thick than long."—Webster.

2. "A pulley or system of pulleys mounted on its frame or shell, with its band or strap. A block consists of one or more pulleys or sheaves, in a groove of which the rope runs, fastened in a shell or frame by pins, on which they revolve; of a shell or frame inclosing the pulley or pulleys; and of a strap or band, consisting of a rope, encompassing the shell, and attached by an eye of rope or a hook to some object."—Ed. Ency.

The interior wheels are termed sheaves, which latter term is often used to designate the whole block or pulley, but incorrectly. A snatch block is a block with only one sheave, and with an opening at the side for the ready insertion and removal of the rope. Blocks without this opening, however, are sometimes loosely termed snatch blocks. See,

BODY BOLSTER SPACING BLOCK.
BODY BOLSTER TRUSS BLOCK.
BRAKE BLOCK.
BUFFER BLOCK.
BRAKE CYLINDER BLOCK.
DISTANCE BLOCK.
STIRRUP BLOCK.
STOP BLOCK.
CENTER PLATE BLOCK.
DEAD BLOCK.
SWING HANGER FRICTION BLOCK.
TRANSOM BEARING BLOCK.

FLOOR TIMBER DISTANCE BLOCK.
FOLLOWER PLATE BLOCK.
GUIDE BLOCK.
PACKING BLOCK.
SAFETY BEAM BLOCK.
SPRING BLOCK.
TRANSOM TRUSS BLOCK.
TRUCK BOLSTER GUIDE BLOCK.
TRUCK BOLSTER TRUSS BLOCK.
TRUSS BLOCK.

BLOCK AND TACKLE. A general term applied to a pair or more of pulleys and accompanying rope. Also termed fall and tackle, or simply tackle.

BLOCK CAR. A car generally attached to wrecking trains, behind the wrecking car proper, for carrying blocking, ropes, chains and other tools. Usually a common box car, sometimes fitted up with bunks.

BLOCKING. A mode of securing together the vertical angles of woodwork by blocks of wood glued or nailed in the inside angle. The method is largely used in every form of carpentry, where great strength is not required in the joint. In car work, generally known as furring blocks.

BLOCKING STRIP. See, FLOOR BLOCKING STRIP.

BLOW OFF VALVE (Gold Car Heating). See, EXCELSIOR STEAM TRAP, etc.

BOARD. "A piece of timber sawed thin, and of considerable length and breadth, compared with the thickness, used for building and other purposes."—Webster. See,

BRAKE FOOT BOARD.
DECK SOFFIT BOARD.
EAVES FASCIA BOARD.
FENDER BOARD.
HEAD BOARD.
INSIDE CORNICE FASCIA BOARD.
INSIDE CORNICE SUB-FASCIA BOARD.
LETTER BOARD.
ROOF BOARDS.
ROOF RUNNING BOARD.
RUNNING BOARD.
SEAT BACK BOARD.
SOFFIT BOARD.
SPLASH BOARD.
TREAD BOARD.

BOARD ROOFS (Freight Cars). A very indefinite term, usually meaning either one with a double layer of boards only, with or without painted canvas or other packing, or a single layer of boards covered with sheet metal. The Winslow and other roofs have boarding over the metal sheets.

BOARDING CAR. A car fitted up for cooking and serving meals to men at work on the line of a road. It is sometimes fitted with sleeping berths and bunks.

BODY. 1. (Of a Car.) The main or principal part in or on which the load is placed. American cars usually consist of a body carried on two trucks.

2. (Of a Valve, Cylinder, etc.) The main or principal part, to which the other parts are attached, as cylinder body, etc.

BODY BOLSTERS. FIGS. 764-820; also 12, FIGS. 159-69, 185-95, 215-22, 271-95, etc.; 10, FIGS. 360-72, 388-91; Freight Car Bolsters, FIGS. 764-810; Passenger, FIGS. 811-20. Cross beams attached near the ends of the under side of a car body which is supported on two trucks. The body center plate and side bearings, which rest on the truck, are fastened to these bolsters. Such beams are made of wood, or of iron, or steel trussed, or of wood and iron combined. A body bolster is sometimes called body transom, or simply transom, but the term body transom is more properly applicable, if used at all, to the needle beams passing from side to side of the car between the trucks; also known as cross frame tie timbers, or cross bearers. A part analogous to a body bolster, and frequently called the body bolster, is the BUNK of logging cars, FIGS. 54-56; but this rests above a reach connecting the trucks, corresponds more properly to the car body, as it sustains the load. The body bolsters of passenger cars are sometimes very elaborate structures, as the DOUBLE IRON BODY BOLSTER, FIGS. 811-13. Iron body bolsters are in the form of a truss, the top member being known as the top plate, or tension bar, and the bottom as the bottom plate, or compression bar, the two being held apart by small castings called body bolster thimbles.

BODY BOLSTER COMPRESSION BAR. 2, FIGS. 804-05, and 12b, FIGS. 159-69, etc. See, BODY BOLSTER. BOTTOM PLATE.

BODY BOLSTER END POCKET CASTING. A cast cap that fits over the end of a composite body bolster, through which the truss rods pass, and on which the truss rod nuts bear. It is a body bolster truss rod washer enlarged so as to cover the entire end of the bolster.

BODY BOLSTER FLITCH PLATES. Plates of iron or steel sandwiched in between pieces of wood and bolted together to give it greater strength. Frequently called body bolster sandwich plates.

BODY BOLSTER SANDWICH PLATES. See above.

BODY BOLSTER SPACING BLOCKS. See, BODY BOLSTER.

BODY BOLSTER TENSION BAR. 1. FIGS. 804-05, and 12a, FIGS. 159-69, etc. See, BODY BOLSTER. TOP PLATE.

BODY BOLSTER THIMBLE. See, BODY BOLSTER.

BODY BOLSTER TRUSS. See, BODY BOLSTER.

BODY BOLSTER TRUSS BLOCK. A block of wood or distance piece on the top of a wooden body bolster between the center floor timbers and underneath the bolster truss rods.

BODY BOLSTER TRUSS ROD. A rod which lies parallel with and passes above the center of the bolster over the truss rod bearing so as to form a truss; generally two are used for each bolster.

BODY BOLSTER TRUSS ROD BEARING. See, BODY BOLSTER TRUSS ROD.

BODY BOLSTER TRUSS ROD SADDLE STRAPS. Straps that connect the truss rods, passing diagonally through the two ends of the body bolster. The strap is a flat bar of iron about 3x½ inch, with a rectangular bend at the ends, into which the truss rod heads fit. These straps bear upon the center sills.

BODY BOLSTER TRUSS ROD WASHER. An iron bearing plate on the end of a body bolster; often made to take two or more rods.

BODY BRACE. 33, FIGS. 159-69, etc.; 51, FIGS. 360-72, etc. An inclined beam or strip of timber in the side or end frame of a car body, which acts as a brace. A substitute for body braces, as well as for truss rods, is the CHALLENDER TRUSS, which see. A compression beam brace, 164B, FIGS. 360-72, answers to the definition of a body brace, but is a long brace, constituting with the compression beam, 164, a single truss or arch from bolster to bolster. A body brace is an oblique brace in one of several panels included in this space. See, BRACE. BODY COUNTER BRACE. END BODY BRACE and SIDE BODY BRACE.

BODY BRACE ROD. 34, FIGS. 159-69; 52, FIGS. 360-72. An inclined iron rod in the side or end of a car body frame, which acts as a brace. They are distinguished as end and side body brace rods. A brace straining rod is a short vertical rod in the side of a passenger car under the window.

BODY CENTER PLATE. 17, FIGS. 159-69, 246-50, 271-95, etc. The upper of the two CENTER PLATES, which see, through which the king bolt, or center pin, passes.

BODY CHECK CHAIN EYE. An eye bolt or clevis for fastening a check chain to the car body. See also, TRUCK CHECK CHAIN EYE.

BODY CHECK CHAIN HOOK. An iron hook on the check chain which enters into the check chain eye.

BODY COUNTER BRACE. 37, FIGS. 159-69, etc. A brace in the side frame of a car body between the bolsters and the end of the car. These braces are inclined in a direction opposite to those between the bolster and center of the car. Sometimes counter braces are inserted in the central portion of the car between the two bolsters. They are then termed center counter braces. See, COUNTER BRACE and FRAMING.

BODY COUNTER BRACE ROD. 37, FIGS. 159-69. Usually an in-

clined iron rod in the side frame of a car body, between the bolster and the end of the car. It may be a diagonal brace rod in a Pratt truss, which runs counterwise with those rods which carry the load. It may then be between the bolsters.

BODY END FURRING (Street Cars). Furring in the end of a car.

BODY END PLATE. A plate across the end of the car joining the side plates together. They are frequently made very wide and heavy. See, END PLATE.

BODY END RAIL. See, END RAIL.

BODY END RIB (Street Car). A rib in the end of a street car. See, BODY RIB.

BODY HAND RAIL. 44, FIGS. 388-91. An iron rod or bar attached to the end of passenger and street cars for persons to take hold of in getting on or off the cars; not to be confused with PLATFORM RAIL, which see.

BODY KNEE (English). No American equivalent. A heavy wrought iron knee, securing the sides of the body to the under frame and keeping them at right angles to one another.

BODY POST (Freight Car Bodies). 42, FIGS. 139-169, 185-95. An upright timber which is framed into the sill and plate of a freight car. The body posts and corner posts form the vertical members of the side frame of a car body. In passenger cars such posts are called WINDOW POSTS, which see. See, POST.

BODY POST POCKET. 42, FIGS. 159-69, etc. See, POCKET.

BODY QUEEN POST. 22, FIGS 360-72, 385-87, 388-91. An iron rod, bar or casting, on the under side of a car body and against which the body truss rods bear. It is often stiffened laterally and longitudinally by a body queen post stay. See also, QUEEN POST.

BODY QUEEN POST STAY. 22b, FIGS. 388-91. See, BODY QUEEN POST.

BODY RIB or SIDE STUD (Street Car). A rib of car body framing which corresponds to the studs. They are curved to conform to the shape of the street car car body.

BODY RING (Pintsch Lamp). 301, FIGS. 2605-21.

BODY SIDE BEARINGS. 16, FIGS. 159-69, 185-95, 223-26, 271-95, etc.; 9, FIGS. 804-05. The upper one of the two SIDE BEARINGS, which see, attached to the body bolsters.

BODY SPRING. A BOLSTER SPRING, which see.

BODY TRANSOM. 22, FIGS. 159-69, etc.; 26, FIGS. 360-72, etc. A name sometimes given to the NEEDLE BEAMS or CROSS FRAME TIE TIMBER, which see, bolted to the under side of the sills.

BODY TRUSS ROD. 19, FIGS. 159-69, 185-95, 215-22, 271-95, etc.; 20, FIGS. 360-72, 385-87, 388-91, and FIGS. 630-33. A long rod under a car body to truss it and prevent it from sagging in the center. This rod is usually continuous from end sill to end sill, but sometimes it is attached to a truss rod anchor iron on or near to the body bolster. In passenger cars the use of the TRUSS ROD ANCHOR IRON, 24, FIGS. 360-72, is very common, although some roads use a continuous rod. The truss rods are distinguished as center and side or outside body truss rods. The center truss rods are universally continuous from end sill to end sill. There are usually four truss rods to a car. See also, INVERTED BODY TRUSS ROD.

BODY TRUSS ROD BEARING. 21, FIGS. 159-69, 185-95, 215-22, 271-95; FIGS. 497-502. A cast or wrought iron plate or post on the under side of a truss block, or of a cross frame tie timber, serving the purpose of a BODY QUEEN POST, which see.

BODY TRUSS ROD HOPPER STRAP. A tie strap passing under and supporting the hopper of a gondola car, the ends of which strap are fastened to the round body truss rods, which carry the stress to the end sills.

BODY TRUSS ROD SADDLE. 20, FIGS. 159-69, 185-95, 215-22, 271-95, etc.; 21, FIGS. 360-72. A block of wood or casting which forms a distance piece on top of a bolster, and on which a continuous body truss rod bears. Properly speaking, a saddle means a common bearing for a pair of rods with a central support, but it is not restricted to such use.

BODY TRUSS ROD WASHER. 19a, FIGS. 159-69. A heavy washer on the outside face of the end sill, on which the nut of the body truss rod bears.

BOGIE (English). A swiveling CAR TRUCK, which see. All American eight wheeled cars and coaches are what are termed in England bogie carriages, or wagons.

BOGIE CARRIAGE (English). A vehicle for passenger service recently much used on the fastest trains. The body is from 40 to 54 feet long, divided into compartments, with side doors, and seating from 30 to 80 passengers. It is carried on four or six wheel trucks. See also, CARRIAGE.

BOGUS PLATE (Refrigerator Cars). A horizontal timber attached to the posts on the inside of the car, a short distance below the plate. The bogus plates support horizontal cross timbers, called meat timbers, or hanging bars, to which hooks are attached for hanging meat.

BOHN REFRIGERATOR. FIGS. 196-98. A system of refrigeration in which the cold air is siphoned from the ice tanks into the circulating passages of the car. The same principle is used on small refrigerators for dining and cafe cars.

BOIES CAR WHEELS. FIGS. 4167-72. A steel tired wheel with a wrought iron single plate, or with a double plate center. The single plate seems most in favor, and is fastened by what the manufacturers call an integral tire lock. This lock and the manner of fastening the tire are shown in the engravings, with the cross section of the tire, FIG. 4168.

BOILER (Steam Shovel). 26, FIGS. 357-59.

BOILER WAGON (English). A six or eight wheeled car having two bogies or trucks at the ends with a drop-down platform between them, adapted to carry any exceptionally heavy or bulky load, such as a boiler, a heavy piece of machinery or a portable engine. It is mechanically an American freight car, with the middle portion dropped down to near the level of the rails.

BOLSTER. FIGS. 764-820, 4057-81, etc. A cross timber or trussed beam on the under side of a car body (BODY BOLSTER, which see), and in the center of a truck (TRUCK BOLSTER, which see). The bolsters carry the body and truck center plates, the body bolster resting on the truck bolster. Special forms for passenger cars are COMPOUND BOLSTER, DOUBLE IRON BODY BOLSTER, which see. FIGS. 811-20.

Truck bolsters are either SWING BOLSTERS, which see, admitting of lateral motion to ease off shocks, or rigid bolsters, which permit no lateral motion. All passenger trucks have swing bolsters. In freight car service the rigid bolster has the preference, and rigid bolster trucks are the more numerous.

BOLSTER BRIDGE (Six Wheel Truck). 62, FIGS. 3781-3951. A SIDE BEARING BRIDGE, which see.

BOLSTER CENTER CASTING. A hollow rectangular shaped casting placed between the draft timbers and body bolster plates; the king bolt passes through it.

BOLSTER DISTANCE BLOCK. The same as a BODY BOLSTER THIMBLE, which see.

BOLSTER END CAP. 17, FIG. 3735. A metal plate over the end of the truck bolster, replacing the bolster truss rod washers used on trussed wooden bolsters.

BOLSTER FLITCH PLATE. The iron or steel plates of a built bolster sandwiched between wood pieces. They are rarely met with now, having been almost entirely superseded by the metal bolster.

They are also called bolster sandwich plates.

BOLSTER JACK SCREWS (Wrecking Cars). Jack screws attached to the spring plank for the purpose of taking the load off the springs and making the entire truck

and car body one rigid structure when the derrick of the wrecking car is in use. TONGS or CRABS, which see, and detached jack screws are used to accomplish the same end.

BOLSTER PLATES (Passenger Car Trucks). FIGS. 4023-25. Wrought iron plates bolted to the sides of wooden bolsters to strengthen them.

BOLSTER SANDWICH PLATE. See above.

BOLSTER SPRINGS. 80, FIGS. 3735-3951, and FIG. 4151. The main springs of a car, carried on the spring plank and supporting the truck bolster, on which the weight of the car body rests.

BOLSTER SPRING CAP. 75, FIGS. 3735-3951; FIGS. 3957-58. See, SPRING PLATE.

BOLSTER SPRING SEAT. 74, FIGS. 3735-3951, and FIGS. 3802-03, 3957-8. See, SPRING PLATE.

BOLSTER TRUSS BLOCK. A timber serving as a distance piece to fill a vacant space between the bolster and the center plate. There are two, a BODY BOLSTER TRUSS BLOCK and a TRUCK BOLSTER TRUSS BLOCK, which see.

BOLSTER TRUSS ROD. See, BODY BOLSTER TRUSS ROD. TRUCK BOLSTER TRUSS ROD.

BOLSTER TRUSS ROD WASHER. See, BODY BOLSTER TRUSS ROD WASHER. TRUCK BOLSTER TRUSS ROD WASHER.

BOLT. 1. A pin, rod or bar of metal used to hold or fasten anything in its place; ordinarily a bolt has a head on one end and a screw and nut on the other, while a rod has a nut on both ends.

Various forms of bolts, which see for further definition, are as follows:

CARRIAGE BOLT.
EYE BOLT.
JAW BOLT.
JOINT BOLT.
KEY BOLT.
LUG BOLT.
MACHINE BOLT.
STRAP BOLT, or U-SHAPED BOLT.

For bolts whose names are derived from the purpose for which they serve, see,

BOX BOLT.
BRAKE SAFETY CHAIN BOLT.
COLUMN BOLT.
DISCHARGE VALVE STOP BOLT.
DRAFT BOLT.
DRAWBAR BOLT.
HUB BOLT.
JOURNAL BOX BOLT.
JOURNAL BOX COVER BOLT.
KING BOLT (or CENTER PIN).
PISTON FOLLOWER BOLT.
REVERSING VALVE PLATE BOLT.
STAKE POCKET U-BOLT.
STOP BOLT.
TIRE BOLT.

2. (Locks and Latches.) A bar which enters the keeper or strike plate and effects the lock. See,

BERTH LATCH BOLT.
CUPBOARD BOLT.
DOOR LATCH BOLT.
DOOR LOCK BOLT.
DOOR SASH BOLT.
DOOR SASH LOCK BOLT.
SEAT LOCK BOLT.
SOFA BOLT.

3. FIGS. 1889-1907. A DOOR BOLT, which see, moved in slides directly by the hand to fasten an opening. See also,

BARREL DOOR BOLT.
FLUSH BOLT.
HEAD BOARD BOLT.
WINDOW BLIND BOLT.

BOLT STOP (Seat Lock). FIGS. 3294-95. A small pin passing through the bolt to check excessive withdrawal.

BONNET (Passenger Cars). A PLATFORM HOOD, which see.

BOOKS, CATALOGUES, PAMPHLETS, ETC. (M. C. B. Standard Sizes). See, M. C. B. REPORTS.

BOOM (Steam Shovel). 6, FIGS. 357-59. The heavy swinging arm which carries the boom engine and ratchet beam. It is stepped at the foot of the A frame and held in its inclined position by boom guys.

BOOM CAP CLEVIS (of a Derrick, Steam Shovel or Crane). FIGS. 357-59. A CLEVIS, which see, sometimes attached to the upper end of the boom, to which the fixed end of the hoisting rope is attached. In other cases the clevis for this purpose is carried on the hoisting block.

BOOM ENGINE (Steam Shovel). 8, FIGS. 357-59. An engine mounted on the boom to operate the ratchet beam.

BOOM FOOT SHEAVE (Steam Shovel). 31, FIGS. 357-59.

BOOM GUYS (Steam Shovel). 12, FIGS. 357-59. Guys from the point of the boom to the top of the A frame, holding the boom in its inclined position.

BOOM IDLER SHEAVE (Steam Shovel). 32, FIGS. 357-59.

BOOM POINT SHEAVE (Steam Shovel). 33, FIGS. 357-59. See, BOOM SHEAVE.

BOOM SHEAVE (of a Derrick, Steam Shovel or Crane). FIGS. 357-59. A sheave carried at the upper extremity of the boom, over which the hoisting chain passes.

BOOM SHOE (of a Derrick or Crane). A casting carried at the foot of the mast and constructed so as to be able to revolve against the boom base. It is supported by boom shoe rods.

BOOM SHOE RODS (of a Derrick or Crane). Rods attached to the head block or cap at the top of the mast and supporting the boom shoe.

BOOM SHOE ROLLERS (of a Derrick or Crane). Rollers at the foot of the mast upon which the boom shoe revolves.

BOSLEY WEATHER STRIPS. FIGS. 2149-52. See, WEATHER STRIPS.

BOSS, OR HUB (of a Steel Tired Wheel). The central portion, through which the axle passes. Boss is the usual English term, but little used in the United States.

BOSTON FINISH FLUSH DOOR BOLT. FIG. 1899.

BOTTLE BREAKING HEAD (Babcock Fire Extinguisher). FIG. 2969. It breaks the acid bottle by screw pressure.

BOTTOM. "The lowest part of anything; as the bottom of a well, vat or ship."—Webster. See,

ALCOVE BOTTOM.
CANDLE LAMP BOTTOM.
DROP BOTTOM.
FIRE PROOF BOTTOM.
HOPPER BOTTOM.
LAMP BOTTOM.
SEAT BOTTOM.
SLIDE BOTTOM.
WATER BOTTOM.

BOTTOM ARCH BAR. 15, FIGS. 3735-53. An inverted arch bar. The pedestal tie bar is sometimes called bottom arch bar. See, ARCH BAR.

BOTTOM CAP (Engineer's Valve). 5, FIGS. 907-09. Another term for a lower cap of a valve.

BOTTOM CASE (Engineer's Valve, etc.). 4, FIGS. 907-09. Another term for a lower case of a valve.

BOTTOM CHORD (of Trusses). See, LOWER CHORD. Neither term is regularly used to designate any part of car trusses, but the side sills are bottom chords in trussed side frames.

BOTTOM CROSS PIECE (English). The transverse piece in the UNDER FRAMING, which see, supporting the floor and partition. Also called bottom cross bar.

BOTTOM DOOR PANEL (English). The lowest panel on the outside of the door of a carriage.

BOTTOM DOOR RAIL. 5, FIGS. 1029-37 and 147, FIGS. 388-91. The lower transverse piece of a DOOR FRAME, which see.

BOTTOM DOOR TRACK. 66, FIGS. 159-69, and FIGS. 674-5. A door track below a sliding door. Usually a metal bar. Sliding doors are often provided with rollers or slides, which rest on the track. Freight car doors usually slide on a TOP DOOR TRACK, which see. See also, DOOR HANGER and CAR DOOR HANGER.

BOTTOM END PIECE (English). American equivalent, end sill. The transverse end piece in the under frame of a passenger vehicle.

BOTTOM LIGHT RAIL (English). A part of the body framing of a carriage, forming the bottom of the window opening.

BOTTOM PANEL BATTEN (English). American equivalent, furring. In a carriage, a part of the body framing used to stiffen the panel, which is pinned to it. See, BOTTOM SIDE PANEL.

BOTTOM PLATE (Metal Body Bolster). 12b, FIGS. 159-69, 223-26, 271-95, etc.; 2, FIGS. 804-05. See, BODY BOLSTER.

BOTTOM RAIL. 1. (Of a Sash or Door.) 147, FIGS. 388-91;

5, FIGS. 1029-37. The lowermost horizontal bar or member of a frame.

BOTTOM SIDE (English). The lower longitudinal framing of the body of a passenger vehicle.

BOTTOM SIDE AND END KNEE (English). A wrought iron knee, joining together the side and end members of the bottom of the body framing of a carriage.

BOTTOM SIDE PANEL (English). The lower panel on the outside of the body of a carriage.

BOTTOM STOVE PLATE (Baker Heater). FIG. 2233. See, ASH PIT BOTTOM.

BOW. See, PLATFORM HOOD BOW.

BOWL. See, BASIN.

BOWL (Pintsch Gas Lighting). A glass bowl used on all center and vestibule lamps.

BOX. See, JOURNAL BOX. WHEEL BOX (Street Cars).

BOX BOLT (Diamond Trucks). 108, FIGS. 3735-3951. The bolts holding the journal box in place. More properly, journal box bolts.

BOX CAR. FIGS. 1-13, 159-84; details, 440-676. A common form of American freight car, with roof and sides inclosed, to protect its contents. They are mounted upon two four wheel trucks. They are usually lined for half their height with inside lining, and sometimes provided with an interior grain tight grain door. See, CAR. FREIGHT CAR.

BOX CAR DETAILS. FIGS. 440-676.

BOX CAR SIDE DOOR AND END DOOR FIXTURES. FIGS. 4668-4704. (M. C. B. Recommended Practice.) In 1897 a committee on this subject reported with details which were afterward adopted by letter ballot as Recommended Practice of the Association. See Proceedings 1897, page 186.

BOX COVER. See, JOURNAL BOX COVER.

BOX CUSHION. FIGS. 3251-53, etc. A cushion for passenger car seats made on a wooden frame. In distinction from a squab cushion, now little used, which is a loose pad on the seat. Box cushions are sometimes stuffed with hair or other elastic material alone, but usually steel springs are used in addition.

BOX FRUIT CAR. FIGS. 7, 208-11. See, VENTILATED BOX CAR.

BOX GUIDE. See, JOURNAL BOX GUIDE. PEDESTAL.

BOX LID. 4, FIGS. 3735-3951. See, JOURNAL BOX COVER.

BOX PACKING. JOURNAL PACKING, which see.

BOX ROOM (Axle). The DUST GUARD SEAT, which see.

BOX STEPS. 45, 46, 48, FIGS. 360-72. Passenger car steps made with wooden stringers or sides. They are to be distinguished from open steps. Ordinarily called the platform steps.

BOX STOCK CAR. An ordinary box car with large grated openings for ventilation, but excluding rain. Little used except for horses. See, STOCK CAR.

BRACE. 33, FIGS. 159-69, 185-95, etc.; 51, FIGS. 360-72, 385-87. An inclined beam, rod, or bar of a frame, truss, girder, etc., which unites two or more of the points where other members of the structure are connected together, and which prevents them from turning about their joints. A brace thus makes the structure incapable of altering its form from this cause, and it also distributes or transmits part of the strain at one or more of the joints toward the point or points of support, or resistance to that strain. A brace may be subjected to either a strain of compression or tension. In the former case, in car construction, it is called simply a brace; in the latter it is called a brace rod.

They are called right or left handed, according to the inclination of their top to a person standing facing the car. See,

BERTH BRACE.
BODY BRACE.
BRAKE LEVER BRACKET BRACE.
DOOR BRACE.
END BODY BRACE.
FLOOR TIMBER BRACE.
PEDESTAL BRACE.
BRAKE SHAFT BRACE.
BRAKE SHAFT STEP BRACE.
COMPRESSION BEAM BRACE.
CORNER POST BRACE.
ROOF BRACE.
SEAT BRACKET BRACE.
SIDE LAMP BRACE.
STOP BRACE.

BRACE POCKET. 39 and 41, FIGS. 159-69, and FIGS. 451-53, etc. A casting which forms a socket for holding the ends of braces, especially of car bodies. See, BRACE, also DOUBLE BRACE POCKET.

BRACE ROD. 34, FIGS. 159-69, 185-95; 52, FIGS. 360-72. An inclined iron rod which acts as a brace. A vertical rod acting in conjunction with a brace is called a sill and plate rod, or, in passenger cars, for short rods below the window, brace straining rod. See, BODY BRACE ROD. COUNTERBRACE ROD.

BRACE ROD WASHER. 38, FIGS. 159-69; FIGS. 487-88 and 514-5. A bearing plate for the nut or head of a brace rod, sometimes made a triangular or beveled shape, and sometimes a flat bar of iron bent to fit into a notch cut in the timber.

BRACE STRAINING ROD (Passenger Car Framing). A vertical iron rod in the side or end frame of a car body by which the upper end of a brace is connected or tied to the sill of the car. The brace rods are members of the truss, of which the sill, braces, posts or plates, etc., form parts. Such rods often have hook heads at the upper ends against which the braces bear, and nuts at the lower ends by which they are screwed up, and are thus brought into a state of tension and the braces into compression. An equivalent in freight service is the sill and plate rod.

BRACKET. 1. "An angular stay in the form of a knee to support shelves and the like."—Webster. See,

ARM REST BRACKET.
BASKET RACK BRACKET.
BELL CORD STRAP HANGER BRACKET.
BERTH BRACKET.
BERTH CORNER BRACKET.
BERTH CURTAIN ROD BRACKET.
BRAKE LEVER BRACKET.
BRAKE SHAFT BRACKET.
BRAKE STEP BRACKET.
COUPLING SPRING BRACKET.
CYLINDER LEVER BRACKET.
DOOR TRACK BRACKET.
HAND RAIL BRACKET.
INSIDE HAND RAIL BRACKET.
LAMP BRACKET.
LAMP CHIMNEY BRACKET.
LONGITUDINAL STEP BRACKET.
POST BRACKET.
RELEASE SPRING BRACKET.
RUNNING BOARD BRACKET
SCHEME ROD BRACKET.
SEAT BRACKET.
SEAT RAIL BRACKET.
SIDE LAMP BRACKET.
SIGNAL LIGHT BRACKET.
SLIDING DOOR BRACKET.
SMOKE BELL BRACKET.
TENDER SPRING BRACKET.
TOWEL BRACKET.
WINDOW CURTAIN BRACKET.

2. (Iron Framing for Bridges or Cars.) An L-shaped angle plate riveted to each of two members which it is desired to connect at right angles to each other, as an end sill bracket, or sill knee iron, 8, FIGS. 360-72. A stronger form, now used in car construction, is called a triangular GUSSET PLATE, which see.

BRACKET (Cast Iron Wheels). FIG. 4222. The stiffening ribs cast on the plate.

BRACKET GAS BURNER. A gas burner attached to the side of a car.

BRACKET LAMP. FIGS. 2569-70. A SIDE LAMP, which see. See, PINTSCH GAS LAMP.

BRACKET NUT. A small SPANNER NUT, which see.

BRACKET STEPS (Hopper Cars). 28, FIGS. 271-95. Steps secured to the side of the car on the inside to serve as a substitute for a RUNNING BOARD, which see.

BRAKE, OR BRAKE GEAR. FIGS. 821-1025. The whole combination of parts by which the motion of a car is retarded or arrested. Passenger car brakes are now almost exclusively air brakes, operated by compressed air. The most important is the Westinghouse, although the New York is in limited use. The air brake is now almost exclusively used in its automatic form, and by the term air brake the automatic brake is understood.

On freight cars the continuous or train brakes have been introduced in large numbers. All new equipment is now supplied with automatic air brakes. The Westinghouse Air Brake Company has supplied the bulk of the equipment.

The brake beams are either inner hung, FIGS. 821-22, or outer hung, FIGS. 823-24. Inner hung brakes are also termed compression rod brakes, the brake lever coupling bar or brake lever strut which unites them being in compression.

BRAKE AXLE (Hand Car). A shaft carrying an S BRAKE SHOE, which see.

BRAKE BEAM. FIGS. 832-873; 84, FIGS. 3781-3951. Transverse iron, steel, or wooden bars to which the brake block and shoes are attached. They are either inner hung or outer hung, and often trussed, especially in passenger service.

BRAKE BEAM ADJUSTING HANGER. 121, FIGS. 3781-3951. A link attached to a brake beam so as to cause the latter and the brake head and shoe to maintain the same relative positions when the brakes are released, so as to prevent the ends of the brake shoes from coming in contact with the wheel when the brakes are released. It is attached to the truck transoms or truck bolster in freight trucks, and to the truck frame end piece in passenger trucks, by a projecting brake beam adjusting hanger carrier, and to the brake beam by an eye or clip. Sometimes called a parallel brake hanger.

BRAKE BEAM ADJUSTING HANGER CARRIER. 120, FIGS. 3781-3951. See above.

BRAKE BEAM ADJUSTING HANGER EYE OR CLIP. 123, FIGS. 3781-3951. See above.

BRAKE BEAM CHAFING PLATE. A plate attached to a brake beam against which a brake spring bears, designed to resist the wear due to the action of the spring.

BRAKE BEAM DATA. (M. C. B.) FIG. 4293.

Certain dimensions and capacities of brake beam were adopted as standard of the Association, by letter ballot, in 1889, and these standards, as modified by subsequent action, are shown for iron brake beams.

All beams must be capable of withstanding a load of 7,500 pounds at center without more than 1-16 inch deflection; where it is necessary to use a stronger beam it must be capable of standing a load of 15,000 pounds at center without more than 1-16 inch deflection.

The angle of brake beam lever is 40 degrees from vertical. Standard heights of brake beams, when measured from the tops of the rails to the center of the face of new shoes, were adopted in 1894, as follows:

For inside hung beams, 13 inches.

For outside hung beams, 14½ inches.

BRAKE BEAM EYE BOLT. Properly an eye bolt for fastening a lower brake rod to a brake beam. They have threads cut nearly their entire length, and usually a nut is placed on each side of the brake beam, which can be screwed up so as to take up the wear of the brake shoes.

BRAKE BEAM FULCRUM. See, BRAKE LEVER FULCRUM.

BRAKE BEAM HANGER (Hand Car). 28, FIGS. 4722-27. A BRAKE HANGER, which see.

BRAKE BEAM KING POST. A post or distance piece which forms a bearing for the truss rods of a brake beam. In metal brake beams the brake lever is attached to it, and it then becomes a brake lever fulcrum.

BRAKE BEAM RELEASE SPRING. See, RELEASE SPRING.

BRAKE BEAM SAFETY CHAIN. See, BRAKE SAFETY CHAIN.

BRAKE BEAM SAFETY GUARD. See, BRAKE SAFETY CHAIN.

BRAKE BEAM STRUT. A brake beam king post.

BRAKE BEAM TRUSS ROD. A rod used to truss or strengthen a brake beam.

BRAKE BLOCK. 82 and 83, FIGS. 3781-3951. A piece of wood or metal which carries a removable shoe which bears directly against the tread of the wheel when the brake is applied. The brake blocks are attached to the ends of a brake beam. A brake head is supposed to be a combined brake block and shoe, but break block and brake head are often used as equivalent terms.

BRAKE CARRIER. See, BRAKE HANGER CARRIER.

BRAKE CHAIN. See, BRAKE SHAFT CHAIN.

BRAKE CHAIN SHEAVE. 160a, FIGS. 388-91. A wheel around which the brake chain passes.

BRAKE CHAIN WORM. 1. 160, FIGS. 388-91; FIGS. 691-92. A conical casting attached to the brake shaft with a screw shaped groove for the brake chain. Its object is to produce a rapid motion at first and increase the power when the brake shoes are brought to a bearing.

2. A cylindrical casting with a screw shaped groove intended only to make the chain wind evenly.

BRAKE CLEVIS. A BRAKE LEVER FULCRUM, which see.

BRAKE CONNECTING ROD. More properly, BRAKE CHAIN CONNECTING ROD, which see.

BRAKE CORD GUIDE. A guide similar to a bell cord guide for the air brake cord, which passes through every car fitted with the Westinghouse signal apparatus, and operates the conductor's valve. See, BELL CORD.

BRAKE CUT OUT COCK. FIG. 943.

BRAKE CYLINDER (Air Brake). FIGS. 916-19 and 975-77. A cast iron cylinder attached to the frame of the car or locomotive, by which the brakes are operated. Upon passenger cars and locomotives the brake cylinder is fitted with two heads, while in the freight brake the auxiliary reservoir and brake cylinder are cast in one piece. The cylinder contains a piston, which is forced outwardly by the compressed air to apply the brakes, and is returned to its normal position when the compressed air escapes by a release spring which is coiled about the piston rod inside the cylinder. The piston rod of the passenger car cylinder, FIG. 916, has a crosshead upon its extremity, which is attached to the cylinder lever. The piston rod of freight car cylinder, FIGS. 918-19, and tender cylinder, FIG. 917, is hollow and loosely incloses a push bar, which latter is attached to the cylinder lever. The piston of the driving brake cylinder has a crosshead to which brake connections are attached. In the Eames vacuum brake a diaphragm takes the place of the brake cylinder.

BRAKE CYLINDER BLOCK (Westinghouse Freight Brake Gear). A stick for attaching the combined cylinder and auxiliary reservoir to the under side of the sills. See, AUXILIARY RESERVOIR BEAM, a similar part for passenger cars.

BRAKE CYLINDER PIPE (Westinghouse Brake). The pipe which connects the brake cylinder with the triple valve.

BRAKE CYLINDER PLATE (Westinghouse Freight Brake). FIGS. 628-9. The plate to which the brake cylinder is bolted and by which it is attached to the sills.

BRAKE DOG. A BRAKE PAWL, which see.

BRAKE DRUM. A BRAKE SHAFT DRUM, which see.

BRAKE EYE BOLT. 85, FIGS. 3781-3951.

BRAKE FINGER. A BRAKE PAWL, which see.

BRAKE FOOT BOARD. A BRAKE STEP, which see.

BRAKE GEAR [(Air) for Freight Cars (M. C. B. Standards)]. FIGS. 4303-7, 4341-44. See, AIR BRAKES—GENERAL ARRANGEMENTS AND DETAILS.

BRAKE GEAR, FOUNDATION (M. C. B. Standard). FIGS. 4308-36.

BRAKE GEAR. (Rules for Interchange of Traffic.)

DEFECTS OF BRAKES WHICH JUSTIFY REPAIRS.

RULE 29. Defective, missing or worn-out parts of brakes, not elsewhere provided for, which have failed under fair usage, except missing material on cars offered in interchange.

RULE 30. Cylinder or triple valves of air brake cars not cleaned and oiled within twelve months and the date of last cleaning and oiling marked on the brake cylinder with white paint.

} Owners responsible.

RULE 31. If 1-inch hose and fittings are found on 1¼-inch train pipe.

RULE 32. Missing or torn air brake hose or missing or broken air brake fittings, angle cocks, cut-out cocks, cylinders and reservoirs, triple valves, release valves and pressure retaining valves or parts of any of these items.

RULE 33. Damage to any part of the brake apparatus caused by unfair usage, derailment or accident.

} Delivering company responsible.

RULE 34. If the car has air signal pipes or air brake pipes, but no air brakes, the hose and couplings on the car are at owner's risk, unless the car is stenciled that it is so equipped.

} Owner's responsibility qualified.

BRAKE HAND RAIL. 190, FIGS. 159-69, etc. A hand rail, on the roof of box and stock cars, usually made of gas pipe, for the protection of brakemen when applying brakes. It is stiffened by a hand rail brace.

BRAKE HAND WHEEL. 93, FIGS. 159-69 and 157, FIGS. 388-9; 475-6. See, BRAKE WHEEL.

BRAKE HANDLE. See, LINDSTROM BRAKE.

BRAKE HANGER. 86, FIGS. 3735-3951. A link or bar by which brake beams and attachments are suspended from a truck frame or car body. It is attached to truck and car body by a brake hanger carrier. Brake hangers are distinguished as hooked, linked and U-shaped.

2. (English.) A wrought iron bar by which the brake block is suspended. No brake beam is used.

BRAKE HANGER BOLT. 188, FIGS. 159-69. A bolt which fastens the brake hanger to the brake hanger carrier.

BRAKE HANGER BEARING. 87, FIGS. 3735-3951. A casting which is held by a brake hanger carrier, and which forms a bearing for a brake hanger.

BRAKE HANGER BRACKET (English). American equivalent, brake hanger bearing. A bearing for the brake hanger, generally made of wrought iron.

BRAKE HANGER CARRIER. 87, FIGS. 3735-3951 and 3870-72. An eye or U-bolt, a casting or other fastening by which a brake hanger is attached to the truck or body of a car. See also, PARALLEL BRAKE HANGER CARRIER and BRAKE BEAM ADJUSTING HANGER CARRIER.

BRAKE HANGER PIN. FIG. 3918. A pin passing through the brake hanger carrier and brake hanger.

BRAKE HANGER TIMBER. A short transverse timber between the floor timbers of a car body, and which is framed into them, and to which the brake hangers, which are hung from the body of a car, are attached.

BRAKE HEAD. 83; FIGS. 3781-3951. A piece of iron or wood attached to a brake beam and which bears against the wheels, and combines both a brake block and brake shoe in one piece. The term is also commonly applied to brake blocks which carry a detachable shoe. See, CHRISTIE, and below.

BRAKE HEAD AND SHOE (M. C. B. Standard). FIGS. 4295-4302. The brake head and shoe shown and known as the Christie brake head and shoe, were adopted as a standard of the Association, by letter ballot in 1886, with the exception of some slight modification in details made since that date. Drawing revised in 1896 and in 1898.

The revision made in 1896 consisted in the modification of the designs of brake head and shoe so as to secure increased clearance at the ends of shoe and equal clearance both above and below the central lug on the back of the shoe; also, the addition of brackets to support the lower bridge lug of brake head similar to the brackets formerly used to support the upper bridge lug. The taper of the shoe was altered so that it would correspond with the taper of the standard wheel tread, by increasing the thickness of the inner edge of the shoe from 1 3-16 inches to 1 5-16 inches.

The revision made in 1898 consisted in reducing the clearance allowed on either side (above and below) the central lug of brake shoe and adjacent lugs of brake head from ⅛ inch to 1-16 inch—the change being made wholly in the head and no change in the shoe.

For action of the Association, see Proceedings 1886, page 72; Proceedings 1888, pages 140, 160, 161; Proceedings 1891, pages 212 and 240.

BRAKE HOSE (Air Brakes). FIGS. 936-37. Flexible tubes made of rubber and canvas by which the cars are connected together, and compressed air, which operates the brakes, conducted through the train. The hose is made with a coupling at each end of each car, so that they can readily be connected or disconnected. See, ARMORED BRAKE HOSE.

BRAKE HOSE ARMOR. See, ARMORED BRAKE HOSE.

BRAKE HOSE COUPLING. (Air Brake). FIGS. 939-40. A contrivance for coupling or connecting the ends of a pair of brake hose together, so that the air by which the brakes are operated can pass from one vehicle in a train to another. The couplings for train signal apparatus are made with thicker lips than brake hose couplings, though otherwise similar, to avoid danger of wrong connections.

BRAKE HOSE COUPLING CASE (Air Brake). FIGS. 939-40. A hollow casting which joins the main part of a coupling to which the hose is attached.

BRAKE HOSE NIPPLE (Air Brake). FIG. 938. A tubular elbow connecting the coupling hose and the brake pipe.

BRAKE HOSE, SPECIFICATIONS FOR. In 1901 the following specifications and tests for an air brake hose were adopted as Recommended Practice:

1. All air brake hose must be soft and pliable and not less than three ply nor more than four ply. These must be made of rubber and cotton fabric, each of the best of its kind made for the purpose; no rubber substitutes or short fiber cotton to be used.

2. Tube must be hand made, composed of three calendars of 1-32 inch rubber. It must be free from holes and imperfections in general, and must be so firmly united to the cottton fabric that it cannot be separated without breaking or splitting in two. The tube must be a high quality of rubber, and must be such composition as to successfully meet the requirements of the stretching test given below; the tube to be not less than 3-32 inch thick at any point.

3. The canvas or woven fabric used as wrapping for the hose to be made of long fiber cotton loosely woven, and to weigh not less than 22 ounces per yard, and to be from 38 inches to 40 inches wide. The wrapping must be frictioned on both sides, and must have in addition a distinct coating or layer of gum between each ply of wrapping. The canvas wrapping to be applied on the bias.

4. The cover must be of the same quality of gum as the tube, and must not be less than 1-16 inch to ⅛ inch.

5. Air brake hose to be furnished in 22-inch lengths. Variations exceeding ¼ inch in length will not be permitted. Hose must be capped on ends with not less than 1-16 inch or more than ⅛ inch rubber caps. Caps must be vulcanized on, not pasted or cemented.

6. The inside diameter of all 1¼ inch air brake hose must not be less than 1¼ inches or more than 1 5-16 inches, except at the ends, which are to be enlarged 3-16 inch for a distance of 2¾ inches, the change from the smaller to the larger to be made tapering.

The outside diameters must be kept within the following dimensions:

The main part of hose 1⅞ inches to 2 inches.

The enlarged ends 2 1-16 inches to 2 3-16 inches.

The hose must be finished smooth and regular in size throughout, as stated above.

7. Each standard length of hose must be branded with the name of the manufacturer, year and month when made, and serial number, the initials of the railway company, and also have a table of raised letters at least 3-16 inch high to show the date of application and removal.

Each lot of 200 or less hose must bear the manufacturer's serial number, commencing at 1 on the first of the year and continuing consecutively until the end of the year.

For each lot of 200 or less one extra hose must be furnished free of cost for test.

All markings to be full and distinct and made on a thin layer of white or red rubber, vulcanized, and so applied as to be removed either by cutting with a knife or sharp instrument.

8. Test hose will be subjected to the following test:

Bursting Test.—Test hose must stand for ten minutes a pressure of 500 pounds before bursting. Each hose must stand a shop test of 200 pounds.

Friction Test.—A section 1 inch long will be taken from any part of the hose and the friction determined by the force and the time required to unwind the hose, the force to be applied at right angles to line of separation. With a weight of 25 pounds suspended from the separated end, the separation must be uniform and regular, and, when unwinding, the average speed must not exceed 6 inches in ten minutes.

Stretching Test.—A 1-inch section of the rubber tube or inner lining will be cut out at the lapped or thickest part. Marks 2 inches apart will be placed on the test piece; it will then be stretched until the marks are 10 inches apart, and released immediately. The piece will then be re-marked as at first and stretched to 10 inches, or 400 per cent, and will remain stretched ten minutes. It will then be released and the distance measured between the marks ten minutes after the release. In no case must test piece show defective rubber or show a permanent set of more than ¼ inch between the 2-inch marks.

Small strips taken from the cover or friction will be subjected to the same tests.

9. If the test hose fails to meet the required tests, the lot from which they are taken may be rejected without further examination. If the test hose is satisfactory the entire lot will be examined, and those complying with the requirements herein set forth will be accepted. All rejected hose will be returned to manufacturers, they paying freight charges both ways.

BRAKE LEVER. 92, FIGS. 3781-3951; details, FIGS. 4308-36, 3845-48, etc. A lever by which the power employed to apply the brakes is transmitted to the brake beams. The brake levers are connected to the brake beams at or near the short ends of the former, and the brake shaft connecting rod, or some equivalent part, to the other end.

When only one brake lever to a truck is used, the pressure of the two brake beams is unequal. To obviate this two brake levers are used, which are further distinguished as dead lever and live lever. The upper end of the dead levers is then attached to a brake lever stop or dead lever guide. Dead levers are also called fixed brake levers. See, CENTRE BRAKE LEVER. FLOATING LEVER.

2. (English.) A long bar attached to the brake shaft in order to apply the brake by hand.

BRAKE LEVER BRACKET. A wrought iron knee on the under side of a car, to which the fulcrum of a brake lever is sometimes attached.

BRAKE LEVER BRACKET BRACE. A diagonal wrought iron brace to stiffen the brake lever bracket.

BRAKE LEVER CLEVIS. A BRAKE LEVER FULCRUM, which see.

BRAKE LEVER COUPLING BAR (Inner Hung Brakes). A compression bar connecting the two brake levers (dead lever and live lever), to which it is fastened by the coupling bar pin. When the brakes are outer hung, this member becomes in tension instead of compression and is known as the lower brake rod. It is called a brake strut.

BRAKE LEVER FULCRUM. 93, FIGS. 3781-3951. A forked iron attached to the brake beam, by means of which a brake lever is connected to the beam. It is usually a jaw bolt. In some cases a casting is used, brake lever jaw. In the trussed iron brake beam the king post of the brake beam becomes the brake lever fulcrum. See, BRAKE BEAM KING POST.

BRAKE LEVER GUARD (English). No American equivalent. A curved wrought iron bar which confines the movement of the brake lever within proper limits. See also, BRAKE LEVER RATCHET.

BRAKE LEVER GUIDE. 94, FIGS. 3781-3951; FIGS. 589-91. An iron bar which guides the upper end of a brake lever. Further distinguished as live lever and dead lever guides, the latter provided with pins for readjustment as the brake shoes wear; and also called a brake lever stop.

BRAKE LEVER HANDLE (English). The handle at the end of the brake lever.

BRAKE LEVER JAW. A BRAKE LEVER FULCRUM, which see.

BRAKE LEVER RATCHET (English). Teeth cut in the BRAKE LEVER GUARD (which see) to prevent the brake coming off after being applied.

BRAKE LEVER STOP. 95, FIGS. 3781-3951 and 3881-83. An iron bar or loop attached to a truck or car frame, and which holds the upper end of a fixed or dead brake lever. It usually has holes in it in which a fulcrum pin is inserted. By moving the pin from one hole to another the lever is adjusted so as to take up the wear of the brake shoes. Also called dead lever guide.

BRAKE LEVER STRUT. A brake lever coupling bar.

BRAKE MAST. A BRAKE SHAFT, which see.

BRAKE PAWL. 103, FIGS. 159-69, etc., and FIGS. 623-4. A small pivoted bar for engaging in the teeth of a BRAKE RATCHET WHEEL, which see. It is placed in such a position as to be worked by the foot.

BRAKE PAWL CARRIER. FIGS. 493-96. See, BRAKE PAWL and BRAKE RATCHET WHEEL.

BRAKE PAWL DOG. FIGS. 523-4. A pivoted casting serving as a weight to throw up the brake pawl so as to engage with the ratchet when the ratchet is on the under side of the brake ratchet wheel. Also applied to an eccentric which holds a pawl against a ratchet wheel.

BRAKE PIN. FIGS. 3918-20. A pin used in the brake lever coupling bar and other connections.

BRAKE PIPE (Air Brake). An iron pipe extending from one end of the car to the other under the car body and connected to the pipes on the adjoining cars by flexible brake hose, serving to convey the air from the air pump on the engine to the auxiliary reservoirs attached to the cars. These pipes are filled with compressed air when the brakes are not on. When the latter are to be applied the air is allowed to escape from the pipes, which causes the triple valves to open communication between the auxiliary reservoirs and the brake cylinders, so that the compressed air stored up in the reservoirs acts on the pistons and brake levers. The popular term for this pipe is a train pipe, or, more properly, a train brake pipe, to distinguish it from the train signal pipe or steam heating pipes.

BRAKE PIPE STRAINER (Air Brake). FIGS. 972-73.

BRAKE RATCHET GEAR, COMPLETE. Includes the ratchet wheel, the pawl, the dog, the carrier.

BRAKE RATCHET WHEEL. 103, FIGS. 159-69. A wheel attached to a brake shaft, having teeth shaped like saw teeth, into which a pawl engages, thus preventing the wheel and shaft from turning backward. In some forms

the ratchet wheel has the ratchet upon the under side, instead of on the edge; the brake pawl being automatically pressed upward against the teeth by a counter weight, called a brake pawl dog, and without being adjusted by the foot of the brakeman. Such a ratchet wheel is shown in FIGS. 505-6. The brake pawl is pivoted in the BRAKE PAWL CARRIER, FIG. 493, which latter is bolted to the roof of the car.

In 1879 the M. C. B. Convention recommended that the practice of placing the ratchet gear on a small platform or brake step be discontinued, and that they be fastened to a suitable casting on the roof. Their recommendation has not been universally adopted. though it is a very common practice.

BRAKE ROD. Any rod serving to connect brake levers, but especially the LOWER BRAKE ROD, 97, FIGS. 3735-3951, which see, and the SECONDARY BRAKE ROD, which see. The brake shaft connecting rod is sometimes called the main brake rod. See,

LOWER BRAKE ROD. MAIN BRAKE ROD.

SECONDARY BRAKE ROD.

2. (English.) A bar of iron connecting the brake shaft arms to the brake blocks.

BRAKE ROD GUIDE. Any form of special support for a brake rod.

BRAKE SAFETY CHAIN, OR LINK. 88, FIGS. 3781-3951. A chain attached by brake safety chain eye bolts to a brake beam and to the truck or body of a car. It is intended for the same purpose as a BRAKE SAFETY STRAP or a BRAKE BEAM SAFETY HANGER, which see, to hold the brake beams in case a brake hanger should break. Sometimes made of a single link or bar. A brake beam safety guard is not bolted or fastened to the brake beam, but is usually a T-shaped forging, the stem being bolted to the truck frame, the cross bar hanging under the brake beam to prevent it falling upon the track if the hanger break.

BRAKE SAFETY CHAIN EYE BOLT. 89, FIGS. 3781-3951. An eye bolt attached to a truck or car body, and which holds a brake safety chain.

BRAKE SAFETY STRAP. 90, FIGS. 3781-3951. A strap of iron fastened to the end piece or transom of a truck and bent into such a shape as to embrace the brake beam. In case any of the hangers should give way, the safety strap is intended to catch and hold the beam and prevent it from falling on the track. Sometimes it is made of steel, and used as a brake spring for throwing off the brake. A BRAKE SAFETY CHAIN, which see, is another device for the same purpose.

BRAKE SHAFT. FIG. 604; 94, FIGS. 159-69, 271-95, etc.; 152, FIGS. 388-91, etc. A vertical shaft on which a chain is wound and by which the power of a hand brake is applied to the wheels. It is sometimes made horizontal, and so called, as 95, FIGS. 164-66, etc. In box and stock cars it extends above the roof, and is called a long brake shaft.

The M. C. B. Association (1879) recommended "that all brake shafts be placed on the left-hand corner of the car when a person is standing on the track facing the end of the car." See, HORIZONTAL BRAKE SHAFT. LONG BRAKE SHAFT.

2. (English.) A horizontal shaft to which are attached brake shaft arms, which actuate the brake blocks. A long lever is attached to it, provided with a handle, by which the brakes can be applied.

BRAKE SHAFT (M. C. B. Position and Dimensions). FIGS. 4479-80.

In 1893 the following Recommended Practice was adopted to protect trainmen from accident, under the sub-heads as given. The brake shaft to be placed on what is the left hand corner of the car when a person is standing on the track facing the end of the car; the ratchet wheel and brake pawl to be fastened to a suitable casting attached to the roof; the center of the brake shaft to be 20 ins. from the middle of the car. In 1902 this was adopted as standard.

BRAKE SHAFT ARM (English). See above.

BRAKE SHAFT BEARING. A metal eye by which a brake shaft is held in its place, and in which it turns. See, BRAKE SHAFT STEP. LOWER BRAKE SHAFT BEARING. UPPER BRAKE SHAFT BEARING.

BRAKE SHAFT BEVEL GEAR WHEEL. 160b, FIGS. 388-91.

BRAKE SHAFT BRACKET. 99, FIGS. 159-69. A support for holding a horizontal brake shaft in its place.

BRAKE SHAFT CHAIN. 150, FIGS. 159-69; FIGS. 619-20. A chain connecting the brake shaft with the brake levers through the brake shaft connecting rods, to the end of which it is attached. The force exerted on the shaft is transmitted by this chain. See, HORIZONTAL BRAKE SHAFT CHAIN.

BRAKE SHAFT CHAIN SHEAVE. A roller over which a brake shaft chain passes.

A sheave attached to the end sill for the chain of a horizontal brake shaft to work in, 105, FIGS. 159-69.

BRAKE SHAFT CONNECTING ROD. 151, FIGS. 159-69, etc. A rod which is attached at one end to a brake chain and at the other to a brake lever, or to the floating lever.

BRAKE SHAFT CRANK (Street Cars). An elbow attached to the upper end of the brake shaft, carrying a handle for turning the brake shaft and operating the brake.

BRAKE SHAFT CRANK HANDLE (Street Cars). Called also a brake shaft crank or a brake handle. See above.

BRAKE SHAFT CROSS BEARER (English). A piece of timber secured to the under frame and carrying a wrought iron bracket, in which the brake shaft works.

BRAKE SHAFT DRUM. The part of a brake shaft on which the brake chain is wound. See, BRAKE CHAIN WORM.

BRAKE SHAFT GEAR WHEEL. 160b, FIGS. 388-91. A bevel gear wheel attached to the brake shaft, by which the power applied to the brake hand wheel is conveyed to a horizontal winding shaft or worm, called a brake chain guide casting.

BRAKE SHAFT HANGER (English). A bracket by which the brake shaft is carried and in which it is free to revolve.

BRAKE SHAFT HOLDER. A BRAKE SHAFT BEARING, which see.

BRAKE SHAFT STAND. A BRAKE SHAFT STEP, which see.

BRAKE SHAFT STEP. 100, FIGS. 159-69, etc.; FIGS. 564-5. A bearing which holds the lower end of a brake shaft. It usually consists of a U-shaped bar of iron, the upper ends of which are fastened to the car body, with a hole in the curved part of the bar which receives the end of the shaft. The brake shaft step should not be confounded with a brake step, which latter is a shelf on which the brakeman may step when applying brakes.

BRAKE SHAFT STEP BRACE. A wrought iron brace to resist the pull of the brake chain.

BRAKE SHAFT THIMBLE. An iron bushing attached to some part of the car to form a bearing for a brake shaft.

BRAKE SHOE. 1. FIGS. 999-1025; 98, FIGS. 3781-3951. A piece of metal shaped to fit the tread of a car wheel and attached by a key or otherwise to a brake block or brake head. The latter term, however, is more properly a combined brake shoe and brake block in one solid casting. The brake shoe rubs against the tread of the wheel when the brakes are applied. Such shoes are made of cast, wrought or malleable iron or steel, usually cast iron.

BRAKE SHOE KEY. FIG. 4300. A key or wedge by which a brake shoe is fastened to a brake block.

BRAKE SHOES, SPECIFICATIONS FOR (M. C. B. Standard). In 1901 the following specifications were adopted as standard as a result of letter ballot:

For Cast Iron Chilled Wheels.—Shoes when tested on the Master Car Builders' Association testing machine, in effecting stops from an initial speed of forty miles per hour, shall develop upon a cast iron

chilled wheel a mean coefficient of friction not less than

22 per cent when the brake shoe pressure is 2,808 pounds.

20 per cent when the brake shoe pressure is 4,152 pounds.

16 per cent when the brake shoe pressure is 6,840 pounds.

For Steel Tired Wheels.—Shoes, when tested on the Master Car Builders' Association testing machine, in effecting stops from an initial speed of sixty-five miles per hour, shall develop upon a steel tired wheel a mean coefficient of friction of not less than

16 per cent when the brake shoe pressure is 2,808 pounds.

14 per cent when the brake shoe pressure is 4,152 pounds.

12 per cent when the brake shoe pressure is 6,840 pounds.

BRAKE SLACK ADJUSTERS. FIGS. 885-88. A device to automatically take up any slack in the brake gear between the air brake cylinder and the brake shoes, so that the piston travel shall not be too great.

BRAKE SPOOL. Also see, BRAKE SHAFT DRUM. An enlargement by a sleeve or otherwise of a brake shaft to give greater speed and less power to the brake gear. A BRAKE CHAIN WORM, which see, is a somewhat similar device.

BRAKE SPOOL STEP (Logging Cars). A U-shaped strap inclosing the brake spool, and equivalent to a BRAKE STEP, which see.

BRAKE SPRING. A RELEASE SPRING, which see.

BRAKE STAFF. A BRAKE SHAFT, which see.

BRAKE STEP. 100, FIGS. 159-69, 271-95, etc. A small shelf or ledge on the end of a freight car near the top, on which the brakeman stands when applying the brake from the top of a car. Also called a brake footboard. A brake step should not be confounded with a BRAKE SHAFT STEP, which see, which is a bearing for the lower end of a brake shaft.

The use of brake steps has been discouraged by the Master Car Builders' Association, which recommended (Chicago, 1879) "that the small platform (brake step) placed at one end of freight cars, to fasten the brake pawl, etc., be discontinued; the ratchet wheel and pawl to be fastened to a suitable casting on the roof."

BRAKE STEP BRACKET. 101, FIGS. 159-69, 271-95, etc.; and FIGS. 641-3. An iron bracket to support a brake step.

BRAKE STRUT. 93, FIGS. 3735-3951. A compression bar or strut between the live and dead levers of a truck with inside hung brakes. Probably the term brake strut is more common than brake lever coupling bar. Brake strut should not be confused with brake beam strut. A BRAKE LEVER COUPLING BAR, which see.

BRAKE TREADLE (Hand Cars). A lever for applying brakes with the foot.

BRAKE VALVE (Air Brakes). The valve operated by the engineman to apply brakes. See, ENGINEER'S BRAKE VALVE.

BRAKE VAN (English). American equivalent, caboose, or baggage car. A covered vehicle in which the conductor (guard) of a train travels, and which is fitted with a powerful screw hand brake. On passenger trains it carries the passengers' baggage (luggage), express matter (parcels), and dogs, etc. On freight (goods) trains it is weighted with pig iron, and is primarily used as a source of brake power. Also called guard's van.

BRAKE WHEEL. 93, FIGS. 159-69, 271-95, etc. A hand wheel attached to brake shaft, and by which the latter is turned.

BRAKE WINDLASS. A term sometimes used to designate the BRAKE SHAFT, which see, with all its attached parts.

BRASS. "An alloy of copper and zinc. The term is commonly applied to the yellow alloy of copper with about half its weight of zinc, in which case it is called by engineers yellow brass; but copper alloyed with about one-ninth its weight of tin is the metal of brass ordnance or gun metal. Similar alloys used for the 'brasses' or bearings of machinery are called hard brass, and when employed for statues and metals they are called bronze." —Toml. Cycl. Useful Arts.

According to present usage, alloys of copper and tin, or of copper, tin and zinc are termed BRONZES, which see. Railroad JOURNAL BEARINGS, which see, are often termed brasses, but they have the composition of bronzes.

BRIDGE. In car construction the term bridge means a timber, bar or beam which is supported at each end. See, BOLSTER BRIDGE. CENTER BEARING BRIDGE. SIDE BEARING BRIDGE.

BRIDGING (Passenger Car Framing). 6, FIGS. 360-72, 388-91, etc. Short transverse distance blocks between the sills of an under frame to keep the sills from displacement or buckling. A sill tie rod is usually employed to keep the sills drawn tightly against the bridging. It is toenailed and sometimes tenoned into the sills with small tenons.

BRILL'S EUREKA MAXIMUM TRACTION PIVOTAL TRUCKS (Street Cars). FIG. 4905.

BRILL'S STREET CAR TRUCKS. FIGS. 4905, 4909-11.

BROAD BAND ELLIPTIC SPRING. FIG. 3246. See, SEAT SPRING.

BROAD BASE JACK. FIGS. 2978, 2985. See, JACK SCREW. HYDRAULIC JACK.

BROAD GAGE. A term applied to a gage when the distance between the head of the rails is greater than 4 ft. 9 ins. The principal broad gage was 5 ft.; other gages were 5 ft. 3 ins., 5 ft. 6 ins., 6 ft. 00 in., etc. These gages have been abandoned and the 4 ft. 8½ in. or 4 ft. 9 in. gage adopted throughout this country on all lines. The broad gages, if any exist, are confined to short branches of no importance. Tracks of 4 ft. 8½ and 4 ft. 9 in. gage allow cars which are gaged by the Interchange Rules to pass over them. See, NARROW GAGE. STANDARD GAGE.

BROAD LACE (English). A woolen fabric made in bands about 4 ins. wide and used as an ornamental border to the upholstery of a carriage.

BROOKS CAR SEALS. FIGS. 3120-39, etc.

BROOM HOLDERS. FIGS. 2958-63.

BRONZE. An alloy composed of copper and tin, sometimes with a little zinc and lead. Bronzes also often contain various other metals and chemical substances, as PHOSPHOR BRONZE, which see. Brass is an alloy of copper and zinc. Most journal bearings are bronzes. The variety of proportions of the various metals is very great.

BRUSH. FIG. 2961, etc. See, CAR WINDOW BRUSH.

BRUSH AND COMB RACK. FIGS. 2785-93.

BRUSHES. Carbon plates pressing on the commutator, for supplying current to the armature.

BRUSH HOLDER. FIG. 4841. A support for the brushes of an electric motor, providing by means of springs for a constant pressure of the brushes on the commutator.

BUCKEYE (Little Giant) CAR COUPLER. FIGS. 1407-20.

BUCKEYE PRESSED STEEL TRUCK. FIG. 3731. A pressed steel truck using a plate side frame somewhat similar to the arch bar form of truck.

BUCKLE (English). See, BEARING SPRING BUCKLE.

BUDA HAND CARS. FIGS. 4719, 4728-30.

BUFFER. An elastic apparatus or cushion attached to the end of a car to receive the concussions of other cars running against it. The term is generally applied to those attachments in which springs are used to give the apparatus elasticity. The term is often applied to a DRAWBAR, which see.

BUFFER ARM. A DRAWBAR TIMBER, which see.

BUFFER BAND (Street Cars). A band of iron or steel fast-

ened to the buffer beam to save it from wear and bruising.

BUFFER BAR. A wrought iron bar at the end of a car carrying a BUFFER PLATE, which see.

BUFFER BEAM. 1. (Freight Cars.) 32a and 32, FIGS. 159-69, 185-95, etc. A transverse timber bolted to the outside of an end sill of a car to which the buffer blocks are attached.

2. (Passenger Cars.) A term sometimes used to designate a platform bend timber.

BUFFER BLOCKS. 32, FIGS. 159-69, 215-22, 223-26, 271-95, etc. Two blocks of wood or iron attached to the end sill or buffer beam of a freight car, in contradistinction to buffer beam, which is a single block in the middle of the end sill, although the latter also is sometimes designated as a single dead block.

Buffer blocks are sometimes called dead blocks.

BUFFER BLOCKS, Dimensions and Location (M. C. B. Standards). The M. C. B. Standard dimensions of buffer blocks and their location, recommended in 1873, are shown in FIGS. 4363-65. Buffer blocks are to be made 8 ins. square on the face and 6 ins. thick, and are to be placed 22 ins. apart from center to center, and to have 14 ins. space between them.

Single dead blocks are to be not less than 30 ins. long, 7 ins. thick and 8 ins. deep, measured vertically. In 1893 a Recommended Practice, as shown, was adopted for buffer blocks, single and double, and location for same suitable for the old link and pin couplers. The beam 36 by 8 by 4 inches shown with the location of double buffer blocks may be omitted if construction of car permits. In 1897 this Recommended Practice was adopted as standard, with some additional details of buffer block.

BUFFER BLOCK FACE PLATE. A metal plate bolted to the face of a wooden buffer block to protect the wood from wear.

BUFFER CUSHION. A circular rubber pad to prevent the platform or buffer springs from being overloaded.

BUFFER GUIDE. See, BUFFER STEM GUIDE.

BUFFER PLATE. 42a, FIGS. 360-72; 29, FIGS. 388-91; 614, FIGS. 1526-1613. A plate (usually bolted to the end of the buffer stems) which bears and rubs against the opposing plate of the next car of the train. The vestibule face plate is bolted or riveted to, and carried by, the buffer plate.

BUFFER ROD (English). A rod which transmits buffing strains from the buffer head to the buffer spring. See also, BUFFER STEM.

BUFFER ROD GUIDE, or BUFFER BLOCK (English). A casting bolted to the outer side of the end sill or head stock.

BUFFER ROD SHOE (English). A casting keyed to the end of the buffer rod which bears on the buffing spring.

BUFFER SAFETY LUG. A projecting horn cast on top of freight drawbars to bear against a buffer block and relieve the draw gear from excessive compressive strains.

BUFFER SHANK. The square part between the buffer head and buffer stem.

BUFFER SPRING BED (English). Serves the purpose of the American draft timber. A timber in the center of the under frame which receives the thrust of the buffing spring.

BUFFER STEM (Janney-Buhoup Platform). 620, FIGS. 1526-1613. The round part which passes through the buffer springs. The term is sometimes applied to the buffer bar, which includes the round stem and the square shank.

BUFFER STEM BRACKET (Janney-Buhoup Platform). 634, FIGS. 1526-1613.

BUFFER STEM END WASHER (Janney-Buhoup Platform). 156, FIGS. 1526-1613.

BUFFER STEM GUIDES. 641, FIGS. 1526-1613. Iron bushings inserted in the platform end sill, in which the buffer stems work. They are to protect the wood from abrasion and wear.

BUFFER STEM RING WASHER (Janney-Buhoup Platform). 154, FIGS. 1526-1613.

BUFFER SPRING. 1. (Passenger Cars.) 630, FIGS. 1526-1613. In the Janney and other platform equipments the springs that resist the compression of a train or the impact when they come together as in coupling. In passenger equipment this thrust is not taken by the drawbar alone, but by the buffers, which transmit it to the buffer springs, which absorb or transmit it to the car body.

2. (Freight Cars.) A synonymous term for draft spring, there being but one set of springs for buffing and draft strains. Draft spring is the preferred term, although both are used.

BUFFET CAR. FIGS. 106-108, 133. A term (meaning, literally, sideboard car) applied to a style of sleeping car or parlor car which has an ornamental buffet, where light lunches can be prepared for the passengers. Buffet smoking cars are also built in the same general style of finish.

BUFFING AND DRAW SPRING (English). See, PLATE BUFFING AND DRAW SPRING.

BUFFING SUB SILL. A sub sill bolted to the center sills on the under side and forming a continuous buffing sill in conjunction with the draft timbers. They are bolted and keyed to the center sills with key blocks and bolts. Also called back stop timber.

BUHOUP PLATFORM. See, JANNEY-BUHOUP PLATFORM.

BULL'S EYE. A convex glass lens, which is placed in front of a lamp to concentrate the light so as to make it more conspicuous for a signal. They are used to close the opening in fixed lamps at the ends of cars, and also in signal lanterns.

BULL'S EYE LAMP. See, SIGNAL LAMP.

BUMPER. An indefinite term used to designate a buffer or drawbar, or a BUFFER BLOCK, which see.

BUMPER BLOCK. A BUFFER BLOCK, which see.

BUNDLE RACK. See, BASKET RACK.

BUNK. 1. A rough form of sleeping berth permanently built against the side of a car. Is also applied to the upper berth of a sleeping car, though it be finished and decorated.

2. (Logging Cars.) A crosspiece similar to a body bolster, on which timber is loaded. See, BODY BOLSTER.

BUNK APRON. 7, FIGS. 1778-83. In a sleeping car, a board nailed to the upper deck sill and projecting several inches below it to cover the edge of the upper berth when it is folded up. In the latest Pullman pattern of berths it has been done away with by rounding the edge of the upper berth or bunk and closing the upper edge against the upper deck sill.

BUNK PANEL. 21, FIGS. 1778-83. A window panel below the inside cornice fascia board of a sleeping car, in the upper berth. It shuts off the upper part of the car window.

BUNK PARTITION. 8, FIGS. 1778-80. The partition between the two upper berths of two adjacent sleeping car sections.

BUNK TRUSS (Logging Cars). An iron strap to stiffen the bunk.

BUNTER BEAM. A buffer beam.

BURLAP. A coarse canvas for use in car upholstery, generally manufactured 24 or 40 ins. wide.

BURNER. FIGS. 2519-25. "That part of a lighting apparatus at which combustion takes place."—Knight. See, LAMP BURNER.

BURNER COCK (Pintsch System Gas Lighting). 21a, FIG. 2524. It is used in wall lamps only. This cock is handled with KEY, 46 (FIG. 2513).

BURROWE'S CAR SHADE. FIG. 3713. A car shade with an automatic shade holder at the bottom, which consists of two rods with rubber tips and springs which

keep the tips pressed out against the window casings. The shade is released by pressing the two rods together by thumb latches.

BURTON STOCK CAR. 1. (For Horses.) FIGS. 59-61. A car specially designed for the transportation of valuable horses and trotting stock.

2. (For Cattle.) One of the older and best arranged cars for the proper transportation of cattle. Arrangements are made for feeding, watering and protection of the stock.

BUSHING. "A lining for a hole."—Knight. Usually a metal cylindrical ring which forms a bearing for some other object, as a shaft, valve, etc., which is inserted in the hole. Often contracted into bush. See,

BELL CORD BUSHING.
BERTH CURTAIN ROD BUSHING.
BERTH HINGE BUSHING.
BRAKE SHAFT BUSHING.
DECK SASH PIVOT BUSHING.
HEAD BOARD BUSHING.
LOWER STEAM VALVE BUSHING.
PIPE BUSHING.
REVERSING VALVE BUSHING.
SASH LOCK BUSHING.
STEAM VALVE BUSHING.
UPPER STEAM VALVE BUSHING.
WINDOW BLIND BUSHING.
WINDOW ROD BUSHING.

2. (Pipe Fitting.) A short tube with a screw cut inside and outside, used to screw into a pipe to reduce its diameter. Generally, a bushing has a hexagonal head by which it is turned, and is sometimes called reducer.

BUSINESS CAR. A term often applied to an officer's or director's car, and sometimes applied to a pay car.

BUTLER DRAWBAR ATTACHMENT. FIGS. 1215-16. A form of attachment using the strap pocket or yoke with thimbles, which engage in what is termed a case or housing, with lugs on the side that engage in grooves cut in the draft timbers.

BUTT. A contraction of BUTT HINGE, which see, and generally used as a substitute for the longer term.

BUTT HINGE. A hinge for hanging doors, etc., which is fastened with screws to the edge of a door, so that when the latter is closed the hinge is folded up between the door and its frame. A hinge the two parts of which are so fastened together that they cannot readily be detached is called a fast joint butt hinge. Other forms are: LOOSE JOINT BUTT HINGE (FIGS. 1947-48), and LOOSE PIN BUTT HINGE (FIGS. 1953-55). In FIG. 1942 the wear is taken by a hinge pin screwing into the knuckle and bearing against a washer. The hinge pin is often ornamented with an acorn, and those having a washer between the two knuckles, but no acorns, are known as BLAKE BUTTS, which see. The best butt hinges have washers, which are generally plain, but FIGS. 1949-52 show a butt hinge with ball bearing washers. Butt hinges are commonly termed simply butts.

BUTTON. This term, besides its usual meaning, has been used to designate an axle collar, but the term is now obsolete. See,

DOOR SASH BUTTON.
DOOR BASE SASH BUTTON.
ECCENTRIC WINDOW BUTTON.
L-WINDOW BUTTON.
PULL ROD BUTTON.
TUFTING BUTTON.
SOLID LEATHER BUTTON.
V-WINDOW BUTTON.
WHEEL BOX BUTTON.
WINDOW BUTTON.

C

CABIN (Pile Driver Car). FIG. 158. A small house for the engine and hoisting gear, usually built on the swinging platform.

CABIN CAR. A term sometimes applied to CABOOSE CARS, which see; more particularly four wheeled caboose cars.

CABLE CAR. A car designed for a street railway in which the tractive power is a cable. The cable is usually placed between the rails and under ground in a conduit.

CABOOSE CAR. FIGS. 63-66, 340-52. A car attached to the rear of all freight trains for the accommodation of the conductor and trainmen, and for carrying the various stores, tools, etc., required on freight trains. Also, but rarely, called conductor's car or train car. Cabooses are made with a lookout for displaying train signals to the locomotive and trains following, and to give the trainmen a view of the train. Caboose cars are either four wheel or eight wheel, and both are in general use; four wheeled cabooses are sometimes termed cabin cars. The eight wheel cabooses are frequently provided with lockers, cooking stove, writing desks, and other conveniences for living.

CAFE CAR. FIGS. 123, 138. A buffet dining car, in which only light meals are served.

CAGE. See, TANK VALVE CAGE.

CALAMINED IRON. See, KALAMINED IRON.

CALDWELL SASH BALANCE. FIG. 3705. See, SASH BALANCE.

CALIFORNIA CAR COUPLER. FIGS. 1392-95.

CAM (Yale Lock). The revolving disk, usually of a spiral eccentric or heart shape, fixed on the outside of the shaft which carries the tumblers.

CAM NUT WRENCH. FIG. 928. A wrench to turn cam nuts.

CAMBER. The upward deflection or bend of a beam, girder, or truss. Freight cars are usually heavily cambered when new by screwing up the body truss rods. Passenger cars have little or no camber.

CANDA BOX CAR. FIGS. 3, 174-75. A box car of large capacity, built with wooden under frame and reinforced sills.

CANDA CATTLE CAR. A stock car having some novel features of construction, which include a deck roof, end door trussing to prevent bulging of end, alternate doors, and a flexible folding partition in the middle of the car.

The partition and arrangements for feeding and watering may be folded out of the way at a moment's notice. It is provided with end doors for loading lumber and rails, and is equipped with Canda swing motion trucks.

CANDA FREIGHT CAR TRUCK. This is a modified type of the suspension car truck with the number of parts considerably diminished. The essential features of it are: 1, the lateral motion of each pair of wheels in the truck frame, which is accomplished by hanging the truck frame in stirrups, over the journal boxes; 2, the carrying of the car body and load on V shaped body side bearings, which bear upon swing links supported in a body bearing casting, which last is also the spring cap. The truck has a center plate, but it acts only as a guide and does not carry the car body or load. The truck has transoms, but no body bolster or spring plank.

CANDA HOPPER CAR. FIGS. 296-97. A wood hopper car in which the sides are trussed with posts and braces on the outside of the planks.

CANDA REFRIGERATOR CAR. A refrigerator car whose chief features are: (1) the insulation, (2) the economic method of effecting it, (3) the arrangements for icing, (4) the circulation of air within the car. The insulation consists of an exterior sheathing of boards which are fluted on inside and allow a circulation of free air beneath them. This is to put the car in the shade and to give a free circulation of air around about the inclosed and shaded car, thus preventing the heat of the sun penetrating to the insulated part of the car. Beneath this exterior sheathing of weather boards is a subsheathing, several layers of tar paper, one of felt 1 in. thick, two ⅜ wood partitions and a lining ⅝ in. thick. The tar paper is tacked upon both sides of triangular frames, which frames wedge the felt in place, thus saving any nailing and fitting.

CANDLE. A special kind of large diameter called car candles

are used for lighting passenger cars and burned in CANDLE LAMPS, FIGS. 2572-76, which see. Since the introduction of high proof mineral oils they are now rarely used. The best car candles are made of paraffin and hydraulic pressed.

CANDLE BOTTOM. FIGS. 2572-76. See, CANDLE LAMP.

CANDLE BRACKET LAMPS (Pintsch System). FIGS. 2572-76. Are for use in emergency, as in case gas gives out. May be attached to wall or to any center lamp at will.

CANDLE HOLDER. See, CANDLE LAMP.

CANDLE HOLDER CAP. 21, FIGS. 2694-2710. See, CANDLE LAMP.

CANDLE HOLDER CUP. 22, FIGS. 2694-2710. See, CANDLE LAMP.

CANDLE LAMP. FIGS. 2572-76. A lamp for burning candles, sometimes elaborated into a chandelier with two or three burners. Candles, however, are now but little used except in emergency bracket lamps, to be used when the gas or electric lights fail. The candle is placed within a candle holder, carried within a candle bottom. The candle holder consists of a candle holder cup and candle holder cap connected by the candle rods and having a light spiral candle spring within. As the candle burns away it is pressed upward by the candle spring against the cap so as to keep the flame always in one position.

CANDLE RODS. 23, FIGS. 2694-2710. See, CANDLE LAMP.

CANDLE SPRING. 24, FIGS. 2694-2710. See, CANDLE LAMP.

CANOPY. FIGS. 2663-73. See, LAMP CANOPY. Also called a SMOKE BELL, which see. A platform hood is sometimes called a canopy.

CANOPY VENTILATOR. See, VENTILATORS.

CANT RAIL (English). American equivalent, plate. A horizontal timber running along the top of the upright pieces in the sides of the body, and supporting the roof and roof sticks. Its upper edge is cut to the bevel of the roof; hence its name.

CANTILEVER TRUSS (Overhang of Underframe). An inverted truss which bears upon the side sill directly over the body bolster. The inner end is connected by a tie rod to the inner end of the truss at the other end of the car body, while the outer end supports the overhang of the underframe by a vertical tie rod and by a diagonal brace rod similar to the overhang truss rod of the old Pullman framing.

CANVAS. A coarse cloth, made of cotton, used for outside covering of street car roofs and for upholstering seats. Roofing canvas is used for covering street cars.

CANVAS LINED SEATING. FIGS. 3241-48. See, CANE SEAT.

CAP. The top or covering of anything. See,

ARM CAP.
BELT RAIL CAP.
BOLSTER SPRING CAP.
BRAKE HOSE COUPLING CAP.
CANDLE HOLDER CAP.
EQUALIZING BAR SPRING CAP.
INSIDE LINING CAP.
LEAKAGE VALVE CAP.
LEFT CHAMBER CAP.
LEVER FRAME CAP.
LOWER CAP OF TRIPLE VALVE.
MAIN CAP OF TRIPLE VALVE.
REVERSING CYLINDER CAP.
REVERSING VALVE CAP.
RIGHT CHAMBER CAP.
SMOKE PIPE CAP.
SPIRAL SPRING CAP.
SPRING CAP.
TANK NOZZLE CAP.
TRIMMING CAP.
TRUSS PLANK CAP.
UPPER CAP OF TRIPLE VALVE.
WINDOW SILL CAP.

CAP NUT. (Triple Valve). 4, FIG. 913.

CAP SCREWS (Air Pump). 99, 100, 111, FIGS. 893-94.

CAR. The term used in the United States to designate a vehicle or carriage for running on a railroad. As the term is usually employed, it denotes any vehicle used for transportation and not belonging to the motive power of a railroad.

The term COACH, which see, is synonymous with passenger car. In England passenger cars, or coaches, are called carriages (first, second and third class), and freight cars, wagons, or trucks, and vans.

Cars are divided into two general classes, passenger cars and freight cars. The latter is also further subdivided into freight cars proper and working or construction cars, the latter including a great variety of types, but a comparatively small number of each type. The prices allowed by the Master Car Builders' Association for the various forms of freight cars will be seen under INTERCHANGE OF TRAFFIC, which see. Street cars, for city and suburban use, take their names from the motive power employed to move them, as electric motor cars, cable cars, etc. They constitute a class by themselves. HAND CARS, which see, are a light vehicle moved by hand power, and under this head should be classed velocipede cars. Among passenger equipment cars the following vehicles are usually classed, not because they carry passengers alone, but rather for the reason that they are run in trains which carry passengers:

BAGGAGE CAR.
BAY WINDOW PARLOR CAR.
BUFFET SLEEPING CAR.
COMBINATION BAGGAGE CAR.
DINING CAR.
DRAWING ROOM, or PARLOR CAR.
EXCURSION CAR.
EXPRESS CAR.
HOTEL CAR.
MAIL CAR.
OFFICERS' CAR.
PALACE CAR.
PARLOR CAR.
PASSENGER CAR OR COACH (first class and second class).
PAY CAR.
POSTAL CAR.
PRIVATE CAR.
SLEEPING CAR.
SMOKING CAR.

Among the cars for regular freight service are:

BOX CAR.
BOX FRUIT CAR.
CABOOSE CAR or CABIN CAR.
COAL CAR.
DOUBLE DECK STOCK CAR.
DROP BOTTOM CAR.
DUMP CAR.
FLAT CAR.
FRUIT CAR.
FURNITURE CAR.
GONDOLA CAR.
GRAIN CAR.
GRAVEL CAR.
HEATER CAR.
HOPPER BOTTOM CAR.
HOPPER CAR.
ICE CAR.
LUMBER CAR.
MILK CAR.
MINE CAR.
OIL or TANK CAR.
ORE CAR.
POULTRY CAR.
REFRIGERATOR CAR.
STOCK CAR.
TIP CAR.

Among working cars are:

AIR BRAKE INSTRUCTION CAR.
BOARDING CAR.
DERRICK CAR.
DITCHING CAR.
INSPECTION CAR.
LOCOMOTIVE CRANE.
PILE DRIVER CAR.
PUSH POLE CAR.
SWEEPING CAR.
SNOW PLOW or FLANGER.
TOOL CAR.
WRECKING CAR.

CAR AXLE. FIGS. 4284-87. M. C. B. Standard. Also, 2, FIGS. 3735-3951. A shaft made of wrought iron or steel to which a pair of car wheels is attached. In nearly all cases the wheels are both rigidly fastened to the axle, but sometimes one or both of them are made so that it can turn independently of the axle. The following are the names of the parts of an axle: Center of Axle, Neck of Axle, Wheel Seat, Dust Guard Bearing, Collar, Journal. See, AXLE. HAMMERED CAR AXLE.

CAR BODY DETAILS. FIGS. 440-1809.

CAR BODIES. FIGS. 159-439.

CAR BOX. A JOURNAL BOX, which see.

CAR BOX JACK SCREW. FIGS. 2981, 2986. A low screw or hydraulic jack to fit under a journal box so as to take the load off the journal bearing and enable it to be removed.

CAR CANDLE. See, CANDLE.

CAR COUPLER. An appliance for connecting or coupling cars together. All passenger car couplers and the

greater part of the freight car couplers in use are automatic.

By Act of Congress, Feb. 27, 1893, all engines, passenger and freight cars engaged in interstate commerce must be equipped with couplers, that couple automatically by impact and that may be uncoupled without going between the cars, on or before Jan. 1, 1898. A penalty of $100 is imposed for each violation of this act, unless the time shall have been extended for each road by the Interstate Commerce Commission after a hearing and for a good cause.

Of automatic couplers there are a great many; the freight couplers all conform to the lines adopted by the M. C. B. Association and shown in FIG. 4362; they differ chiefly in the lock and the device for uncoupling. The general dimensions of the coupler universally adopted for freight service are given under FIGS. 4345-61, with the limit gages to which all M. C. B. couplers should conform. The same gages are applicable to passenger couplers. The method of attachment of coupler recommended by the M. C. B. Association is shown in FIGS. 4490-4506, 4537-50.

CAR CYLINDER (Air Brake). Any one of several kinds of Brake Cylinders shown in FIGS. 916-19, 975-77.

CAR DISCHARGE VALVE (Train Signaling Apparatus). FIG. 958. A valve placed in the end of the car and connected with the signal cord. When the cord is pulled the car discharge valve is opened and the air escapes, which blows the whistle in the locomotive cab. See, TRAIN SIGNALING APPARATUS.

CAR DOOR HANGERS. FIGS. 2153-66. A device for hanging a sliding door so that it may be movable. In common practice the simple hooks upon which most freight car doors are hung are termed simply DOOR HANGERS (which see), while more elaborate forms with rollers have their names expanded into car door hangers.

Car door hangers with wheels or rollers to prevent friction are termed door sheaves, of which there are various types.

CAR DOOR LOCK. FIGS. 1889-2090. A lock for a car door, usually meaning for a passenger car door. See, FREIGHT CAR LOCK. PADLOCK.

CAR DOOR SHEAVES. See, DOOR SHEAVES and CAR DOOR HANGERS.

CAR DRAIN CUP (Air Brake). FIG. 980. An attachment to the brake pipe of every car to collect the water of condensation, which is drawn off from time to time by a cock at the bottom; it is usually combined with an air strainer and so called.

CAR FURNISHINGS. FIGS. 1810-3728. The hardware, upholstery materials and other fittings, such as lamps, ventilators, water coolers, etc., used in finishing a passenger car. In general it includes those parts of a car that are applied after it has left the paint shop.

CAR HEATER. Any apparatus for heating cars by convection; that is, by conveying hot water, steam, or warmed air into, or through, the car. It generally refers to any arrangement for warming cars other than stoves. See, BAKER, CONSOLIDATED, GOLD and SAFETY HEATING SYSTEMS. See also, STOVE.

CAR MOLDINGS. See, MOLDINGS. See also, CAR SEAT MOLDINGS (FIGS. 3268-79), which latter are metal bands for seat backs.

CAR PLATFORM. More commonly, simply PLATFORM, which see. See, PLATFORM FURNISHINGS.

CAR PUMP. A BASIN PUMP, which see.

CAR REPLACER. A device for getting a derailed truck back onto the track. It usually consists of two inclined planes, by which the wheels are raised so that the flange of the outside wheel can ride upon and over the rail. They are placed at an acute angle with the track so as to guide the wheels and force them upon the track. See, WRECKING FROG.

CAR ROOF. FIGS. 1714-77. A covering for a car, supported by the carlines and purlins. The various forms in use in freight car construction may be divided generally into the four following classes: First, what is known as a double board roof, with or without felt or other material between boards. To this class belong many roofs in which the boards are tongued and grooved and have a sheet of painted canvas, asphalt roofing material or other prepared materials between them. Second, single board roofs, covered with tin or other sheet metal. Third, roofs made of metal sheets, fastened to purlins and roof strips, and protected by a single layer of roughly matched boards. Fourth, a type of double roof consisting of inside roof covered with felt, tar paper or asphalted canvas, and an outside roof built over it to protect the roofing material from injury. Passenger car roofs are commonly of tin, zinc or galvanized iron or steel of about 22 W. G., painted. For street cars, painted canvas is used. See also, BOARD ROOF. In respect to form, see, ARCHED ROOF, DECK ROOF, A CAR ROOF, and X CAR ROOF.

CAR SEAL. FIGS. 3120-41. A device to secure freight car doors against opening by making it impossible without destroying the seal. The original form consisted of a lead disk with two holes to receive a piece of twisted wire, which is compressed by a die so as to leave a seal mark, which must be defaced or the wire cut before the door can be opened. To prevent stripping the seal from the wire and re-inserting it, a detective wire of irregular cross section is used, FIGS. 3133 and 3137. Sheet metal eye shackles, in a variety of other forms, are now also used, with or without tin return tags, and also a simple lead rivet with a tin shackle. Tin shackles often have the name of the road printed on them. Of seals there are a great variety, some of the more common of which are shown. See also, SEAL LOCKS. SEAL PRESS.

CAR SEAT. FIGS. 3142-3255. The complete set of fixtures on which passengers sit in a car. It ordinarily consists of a seat frame, seat cushions, seat back, arm rest, foot rest, and their attachments. Ordinarily, the seats in American cars are placed crosswise of the car, and are made for two passengers. The backs of the seats are generally made reversible. The seats of parlor cars are commonly called chairs (see, REVOLVING CHAIR, RICHARDS PANEL BACK CHAIR). To replace chair cars these chairs have been superseded by so called TWIN SEATS, which see. In private and parlor cars, sofas, placed longitudinally against the side of the car, are sometimes used. In order to give an inclination to the seats which makes them more comfortable, various devices have been introduced. In fact, all first class car seats not only incline the seat cushion, but they move it bodily forward, as well as automatically adjust the back. Other improvements in seats are the head roll (FIGS. 3154-56), the extra high seat back (FIGS. 3186-87), the adjustable foot rest (FIGS. 3186-87). The covering of seats is usually plush, but sometimes CANE or RATTAN SEATS, CANVAS LINED CANE SEATS, PERFORATED VENEER SEATS, WOVEN WIRE SEATS (which see) are used. The seats of street cars are usually placed longitudinally on each side of the car, as shown in FIG. 3239, but in open cars they are usually transverse and in length equal to the full width of car.

CAR SEAT CONNECTING ROD. 25, FIGS. 3151-52. A round rod connecting wall and aisle seat ends of a Scarritt seat with adjustable foot rests.

CAR SEAT MOLDINGS. FIGS. 3237-38. Metal bands, usually nickel plated, used to finish seat backs. They are either plain or beaded. See, MOLDINGS.

CAR SHOP MACHINERY. FIGS. 4912-4969.

CAR SIGNAL VALVE (Train Signaling Apparatus). FIG. 958. A valve placed in every car and attached to the bell cord or signal cord, by which air is allowed to

escape from the signal pipe, thus blowing the signal whistle on the engine. It is more often called a car discharge valve.

CAR SPRING. FIGS. 4138-51, 4652-58, etc. See, SPRING. SPIRAL SPRING. ELLIPTIC SPRING. BOLSTER SPRING. A general term applied to springs on which the weight of a car rests, and also to draw and buffer springs.

CAR STEPS. See, PLATFORM STEPS.

CAR TRUCK. FIGS. 3729-4056. Mechanically, a small, low, four wheeled (or sometimes six wheeled) car, carrying as a dead load one-half the weight of a long car body. The car body is usually carried on a pair of center plates (truck center plate and car body center plate), with a center pin or king bolt passing through them, about which the truck, or, more properly speaking, the car body, can swivel. In England such trucks are called "bogies." See, TRUCK.

CAR WASHER. FIGS. 2961, 2964-65. A brush made for washing the outside of passenger cars. It is made of bristles or feathers.

CAR WHEEL. FIGS. 4152-4237; I, FIGS. 3735-3951. A wheel for a railroad car. Chilled wheels are called single plate wheels or double plate wheels, according to the number of plates between the hub and rim. When one plate is used it is sometimes made flat, with ribs called brackets on the back, and sometimes corrugated, without ribs. The disks of double plate wheels also are generally corrugated. What is known as the Washburn wheel has two corrugated disks extending from the hub about half way to the tread, and a single plate, with curved brackets on the back between the tread and the double plates. This wheel is generally known as a double plate wheel. Cast iron wheels are also made with spokes, either solid or hollow, principally for locomotive use. Those in use in this country are either cast iron with a chilled tread and called chilled wheels, or are steel tired with wrought or cast iron or combination center. For freight cars the cast wheel with a chilled tread is largely in use.

Prices of wheels and axles and cost of work on same have been fixed at various times by the rules for interchange of cars of the M. C. B. Association. See, INTERCHANGE OF TRAFFIC.

The parts of wheels are the flange, tread, rim, tire, retaining rings, plate, ribs, spokes, center, hub and axle seat.

The varieties of cast iron wheels besides the single plate, double plate and Washburn, above mentioned, are the combination plate wheel, combination wheel, hollow spoke wheel, open plate wheel, spoke wheel. See, STEEL TIRED WHEEL.

In 1893 the M. C. B. Association adopted specifications for cast iron wheels and a form of guaranty by manufacturers as Recommended Practice. These had formerly been standards of the Association. See, WHEELS, SPECIFICATIONS AND GUARANTEE.

See also the following wheels:

ALLEN, FIGS. 4152-66.
BOIES, FIGS. 4167-72.
CHILLED CAST, FIGS. 4214-24.
GRIFFIN, FIGS. 4217-20.
KEYSTONE, FIGS. 4223-24.
KRUPP, FIGS. 4200-05.
LOBDELL, FIGS. 4214-16.
MCKEE-FULLER, FIGS. 4173-76.
PAIGE, FIGS. 4178-83.
SNOW'S FIGS. 4187-95.
STANDARD, FIGS. 4206-13.
TAYLOR'S, FIGS. 4196-99.
WASHBURN, FIGS. 4184-86.

CAR WINDOW BLIND. See, WINDOW BLIND.

CAR WINDOW BRUSH. FIGS. 2961, 2964-65.

CARD RACK. A small receptacle on the outside of a freight car to receive cards giving shipping directions.

CARD TABLE. 27, FIGS. 1778-83. See, TABLE.

CAREY PLASTIC CAR ROOF. FIGS. 1776-77. A roofing material the body of which is composed of a very heavy layer of woolen felt, thoroughly saturated with a secret compound which it is claimed preserves the roofing itself and also the upper and lower boarding with which it comes in contact. See, CAR ROOF.

CARLINE, or CARLING. 81, FIGS. 159-69, etc.; 100, FIGS. 360-72, etc. A transverse bar of wood or iron which extends across the top of a car or from one side to the other, and which supports the roof boards. In passenger cars carlines are divided into main carlines, passing entirely across the car; short carlines or deck carlines, which are confined to the upper deck, and rafters, which are confined to the lower deck. The carlines of freight cars are also rarely called rafters. The main carlines are usually compound, i. e., built up of wood and iron. They sometimes pass directly from side to side of the car across and under the upper deck, when they are termed continuous or straight carlines, but usually are bent to the outline of the clear story, when they are termed profile carlines. In freight cars the main carline is one made stronger than the others for carrying the purlins and roof. Other carlines having special names, which see, are:

END CARLINE.
PLATFORM HOOD CARLINE.
PLATFORM ROOF CARLINE.
PLATFORM ROOF END CARLINE.

CARLINE KNEE IRON. An angle iron which connects the end carline to the plate.

CARLTON & STROUDLEY FASTENING (Steel Tired Wheels). FIG. 4230. See, TIRE FASTENING.

CARPET EYELET. FIG. 2167. See, EYELET.

CARPET KNOB. An EYELET NAIL, which see.

CARRIAGE, OR RAILWAY CARRIAGE (English). American equivalent, passenger car, or coach. A vehicle for passengers, having four, six, eight, or twelve wheels (usually six wheels). It is divided into compartments by transverse partitions extending the full width of car. A first class compartment seats six or eight passengers, and a second or third class compartment ten passengers. About 89½ per cent of the total number of passengers travel third class, which really corresponds to the so-called "first class" here, the real first class being carried in sleeping and parlor cars. The English first class is used by about 3½ per cent of the passengers. The second is an intermediate class which is gradually going out of use. See also,

BOGIE CARRIAGE.
COMPOSITE CARRIAGE.
CORRIDOR CARRIAGE.
FIRST CLASS CARRIAGE.
LAVATORY CARRIAGE.
SALOON CARRIAGE.
SECOND CLASS CARRIAGE.
SMOKING CARRIAGE.
SLEEPING CARRIAGE.
THIRD CLASS CARRIAGE.
TRI-COMPOSITE CARRIAGE, or TRI-COMPO.

CARRIAGE BOLT. A bolt made square under the head so as to prevent it from turning when in its place. They usually have button shaped heads and are used for fastening wooden objects together.

CARRIAGE TRUCK (English). An open four wheeled vehicle, with low sides, adapted to run on passenger trains, and carry a road vehicle.

CARRIER. See,

BRAKE HANGER CARRIER.
BRAKE PAWL CARRIER.
FOOT REST CARRIER.
PARALLEL BRAKE HANGER CARRIER.
SPRING PLANK CARRIER.

CARRY IRON. See,

DRAWBAR CARRY IRON.
DRAWBAR STIRRUP.
DRAW TIMBER CARRY IRON.

CASE. "A covering, box, or sheath; that which incloses or contains: as a case for knives; a case for books; a watch case; a pillow case."—Webster. See,

BRAKE HOSE COUPLING CASE.
DOOR CASE.
LAMP CASE.
LOCK CASE.
SPRING CASE.
TOOL CASE.
TRIPLE VALVE CASE.

CASING. I. (For Heaters.) See,

HEATER PIPE CASING.
INSIDE CASING.
PERFORATED SMOKE PIPE CASING.

OUTSIDE CASING. SMOKE PIPE CASING.

2. (For Windows.) The frame which surrounds a window. See, WINDOW CASING.

CASTER. FIGS. 3350-53. A small wheel on a swivel attached to furniture and on which it is rolled on the floor. By custom of the trade, furnishings which are in reality mere sockets or knobs are termed casters, although they are, strictly speaking, not such, not having any rollers. They are distinguished as chair casters, table casters, sofa casters, etc., according to size and probable use.

CASTER HOLDER (Dining Cars). A shelf or tray for holding bottles of condiments.

CAST IRON DOUBLE PLATE WHEEL. FIG. 4214. See, DOUBLE PLATE WHEEL. CAR WHEEL.

CAST IRON SPOKE CENTER WHEEL. FIGS. 4208, 4219-20, 4223, etc.

CAST IRON TOP (Baker Heater). FIG. 2232. A plate which forms the top of the fire chamber. It has perforations around the outside and an opening in the center through which the stove is supplied with coal.

CAST WHEELS. FIGS. 4217-24. See, CAR WHEEL. CHILLED WHEEL. CHILL.

CASTING. Any piece of metal which has been cast in a mold. See,

CORNER CASTING. SIDE CASTING.
DRAW BAR SIDE CASTING. TRANSOM CASTING.
ROOF CORNER CASTING.

CATCH. See,

CUPBOARD CATCH. SECOND CATCH.
DECK SASH CATCH. SLIDING DOOR HOLDER
DOOR HOLDER CATCH. CATCH.
RATCHET CATCH. VESTIBULE GATE CATCH.

CATCH LEVER (Janney Coupler). 523, FIGS. 1526-1613. A crank lever passing vertically through the catch, by means of which it is caused to release the knuckle for uncoupling.

CATCH SPRING (Janney Coupler). 525, FIGS. 1526-1613. A coiled spring on the catch spring bolt operating the catch.

CATCH SPRING BOLT (Janney Coupler). 543, FIGS. 1526-1613. The bolt on which the catch of Janney coupler slides.

CATTLE CAR. FIGS. 57-58, 212-222. More properly STOCK CAR, which see.

CEILING. The inside or under surface of the roof or covering of a room or car opposite the floor. This term is sometimes used to mean SHEATHING, which see. When the ceiling of a passenger car is made of painted canvas or other decorated lining it is termed head lining, the term ceiling in modern usage being restricted to wood ceiling. The term panel ceiling is also used as synonymous with wood ceiling, although cloth head lining is also sometimes put on in panels. DEAFENING CEILING, which see, is boarding under the sills of the car, making an air space between the sills. See, LIGNOMUR, VENEERING, PANELING.

CEILING FURRING. Strips or pieces fastened to the carlines overhead, and to which the paneling or veneering of the ceiling is applied.

CEILING PLATE FOR GAS ARM (Pintsch Lamp). 487, FIGS. 2605-21.

CEILING VENEERS. Thin boards with which the ceilings of passenger cars are covered. The term is also misapplied to the thin preparations of papier maché, etc., in imitation of natural wood veneers.

CENTER BEARING. The place in the center of a truck where the weight of the car body rests. A body center plate attached to the car body here rests on a truck center plate attached to the truck. The general term center bearing is used to designate the whole arrangement and the functions which it performs, in distinction from SIDE BEARING, which see.

CENTER BEARING ARCH BAR. 66, FIGS. 3948-51. See, CENTER BEARING BRIDGE.

CENTER BEARING BEAM. 65, FIGS. 3948-51 and 4008-9. See below.

CENTER BEARING BRIDGE (Six Wheel Trucks). 66-7, FIGS. 3948-51 and 4038-9. A longitudinal iron beam, formerly sometimes a wooden beam, the ends of which rest upon the spring beams, and by which the truck center bearing beam, 65, carrying the center plates, is supported. It consists of the center bearing arch bar and inverted arch bar, inclosing between them the center bearing beam. Truck side bearings, 61, similar in form to an arch bar, are also attached to the extremities of the spring beams, connecting them together.

CENTER BEARING INVERTED ARCH BAR. 67, FIGS. 3948-51. See above.

CENTER BLOCK. A CENTER BEARING BEAM, which see.

CENTER BLOCK COLUMN. FIGS. 3981-3. A column placed on top of the center plate block and between it and the center bearing arch bar.

CENTER BLOCK FLITCH PLATE. FIGS. 4036-37. See, CENTER BLOCK and FLITCH PLATES.

CENTER BODY TRUSS RODS. Those nearest the center when two or more body truss rods are used under each side of a car body.

CENTER BUFFER FOLLOWER GUIDE. See, COMBINATION FOLLOWER GUIDE.

CENTER BUFFER SPRING. A spiral spring situated above the draft springs, intended for buffing purposes only.

CENTER BUFFER STEM. See, BUFFER STEM.

CENTER CASTING (Pintsch Lamp). 382, FIGS. 2605-21.

CENTER CASTING DIAPHRAGM (Pintsch Lamp). 383, FIGS. 2605-21.

CENTER COMPRESSION BEAM BRACE. In passenger car framing, a brace for the compression beam in the center of the side truss.

CENTER COUNTERBRACE. A counterbrace in the body of the car between the trucks, to stiffen a compression beam brace. See, COUNTERBRACE.

CENTER CROSS BAR (English). See, BRAKE SHAFT CROSS BEARER.

CENTER CROSS BEAM. A cross timber framed into the two intermediate sills of a coal or ore car, to which the center doors are hung.

CENTER CROSS BEAM CAP. A cap piece to cover the center cross beam.

CENTER CROSS TIE TIMBER. A cross tie timber in the middle of a car, generally placed between the double drop doors of a gondola car.

CENTER DOOR HINGE AND STOP (English). The center of three brass hinges securing the door to the body. The insertion of two rubber plugs into striking pieces or side wings on the hinge constitutes Cross's patent stop, which is used to prevent the door striking the outside of the body when thrown violently open. See also, SEAT RAIL SUPPORT.

CENTER DOOR RAIL. See, MIDDLE DOOR RAIL.

CENTER DRAFT DRAW BAR. A draw bar which is connected directly with the king bolt of a truck. It is a style specially designed for use on the very sharp curves (of 90 and 100 ft. radius) of elevated railroads, and is confined to those lines.

CENTER DRAFT TUBE (Argand Lamp). The hollow passage for air in the center of the burner.

CENTER FLOOR TIMBERS. The CENTER SILLS, which see.

CENTER GIRTH. See, DOOR CENTER GIRTH.

CENTER LAMP. FIGS. 2690-91, 2702-07. A lamp suspended from the center of the ceiling of a car. The term is used to distinguish center lamps from side lamps, the latter being attached to the sides of cars. Center lamps having two or more burners are commonly called chandeliers.

2. PINTSCH GAS CENTER LAMPS, which see. FIGS. 2583-98.

CENTER PIECE (Air Pump). 62, FIGS. 893-94, and 35, FIG.

965. An iron casting which forms the lower head of a steam cylinder, and the upper head of an air cylinder.

CENTER PIN, OR KING BOLT. FIGS. 557-58. A large bolt which passes through the center plates on the body bolster and truck bolster. The truck turns about the bolt. It normally has no strain upon it and no key or nut at the lower end. It is therefore a mere pin and not a bolt in the usual sense, but in wrecking cars the center pin is sometimes provided with keys to fasten the truck and car body firmly together. The name king bolt is derived from the name of the corresponding part for the front wheels of a wagon. Center pin, however, is the more common term.

CENTER PLATE. FIGS. 545-7; 17, FIGS. 159-69; 63, FIGS. 3735-3951. One of a pair of plates made of cast or malleable iron or pressed steel, which support a car body on the center of a truck. There are two, the body center plate and the truck center plate, which are sometimes also called the male and female center plates. The CENTER PIN or KING BOLT (which see) passes through them, but carries none of the strain except in emergencies.

CENTER PLATE BLOCK. 64, FIGS. 3781-3951. A piece of wood placed under a truck center plate to raise it up to the proper height.

CENTER SILLS. 4, FIGS. 159-169, 185-95, 215-22, 360-372, etc.; 5, FIGS. 246-50, 271-95, etc. The two main longitudinal timbers underneath the floor which are nearest the center of the car. In iron frame cars they are usually I BEAMS, or channels, which see.

2. (Hand Car). 10, FIGS. 4722-27.

CENTER SILL COVER PLATE (Steel Cars). 121, FIGS. 271-95. A flat plate riveted across the top of the center sills to give additional strength in resisting longitudinal shocks and to prevent buckling of the sills.

CENTER STAY (of a Chandelier). 30, FIGS. 2694-2710. The central support around which the lamps are grouped. In some cases it is the only method of attaching the chandelier to the ceiling, and in others there are several inclined roof braces or vertical lamp arms in addition.

CENTER STEM (Janney-Buhoup Platform). 987, FIGS. 1526-1613.

CENTER STEM THIMBLE (Janney-Buhoup Platform). 845, FIGS. 1526-1613.

CENTER STOP (Tip Car). A bracket or block attached to a draw timber to restrain the body from moving longitudinally.

CENTER STRUT FOR HOPPER FLOOR (Hopper Car). 46, FIGS. 271-95. An inclined strut or support for the hopper floor between the bolster and the end of the car, fastened to the center of the end sill. See, SIDE STRUT FOR HOPPER FLOOR.

CENTER SUSPENSION LAMP. See, PINTSCH LAMPS.

CENTERING GAGE. A gage to fix the middle point of an axle. See, MOUNTING WHEELS.

CENTRAL FILLING PIECE (Steel Tired Wheels). The part surrounding the hub and connecting it with the tire. Also termed the skeleton. A wheel center is a hub and central filling piece combined in one.

CHAFING PLATE. A metal plate to resist wear, used on brake beams, truck transoms, swinging spring beams, etc. See,

- BRAKE BEAM CHAFING PLATE.
- CHECK CHAIN CHAFING PLATE.
- DRAWBAR CHAFING PLATE.
- TRANSOM CHAFING PLATE.
- TRUCK BOLSTER CHAFING PLATE.
- COUPLING PIN CHAFING PLATE.

2. (Janney-Buhoup Platform). 1120, FIGS. 1526-1613. A bar across the top of the stirrup.

CHAFFEE DRAWBAR CENTERING DEVICE. FIGS. 1706-7 and 1712-13. A device to permit displacement of the drawbar on rounding curves, which also tends to hold the drawbar in a central position at all other times. The type for passenger cars is shown in FIGS. 1706-7; that for freight cars in FIGS. 1712-13.

CHAIN. "A series of links or rings connected, or fitted into one another, usually made of some kind of metal." —Webster. See,

- BASIN CHAIN.
- BERTH CHAIN.
- BRAKE SAFETY CHAIN.
- BRAKE SHAFT CHAIN.
- CENTER BRAKE LEVER CHAIN.
- CHECK CHAIN.
- CONNECTING CHAIN.
- COUPLING CHAIN.
- DOOR PIN CHAIN.
- DRIVING CHAIN.
- DROP BOTTOM CHAIN.
- HOISTING CHAIN.
- HORIZONTAL BRAKE SHAFT CHAIN.
- LOCK CHAIN.
- MANHOLE COVER CHAIN.
- PITCH CHAIN.
- PLATFORM RAILING CHAIN.
- RAILING CHAIN.
- SAFETY COUPLING CHAIN.
- TANK NOZZLE CAP CHAIN.
- UNCOUPLING CHAIN.
- WEDGE CHAIN.

CHAIN AND EYE (for Door Bolt, Postal Car Fittings). FIG. 3078.

CHAIN COUPLING LINK. Two or more coupling links attached together like a chain. Used with a DRAW HOOK, which see.

CHAIN HOLDER (for Basin Plug). FIG. 2770. A STANCHION (which see) provided with screw thread and nut for passing through the marble slab. Also called a chain post, chain stay.

CHAIN POST. See, CHAIN HOLDER.

CHAIN STAY. See, CHAIN HOLDER.

CHAIR. FIGS. 3157-65, 3192-94, 3224-25. The usual designation for the seats of parlor cars. See, REVOLVING CHAIR.

CHAIR ARM PLATE. A metal plate for the top of a chair arm. If for common passenger car seats it is called an ARM CAP, which see.

CHAIR CAR. FIGS. 72, 77. The term chair car generally is applied to a car equipped with reclining chairs or twin car seats, and which car is run on local night trains so that passengers may rest.

CHAIR CASTER. See, CASTER.

CHAIR LEG CASTER OR SOCKET. FIGS. 3350-53. A hollow casting which fits on the end of a chair leg. Such casters, when casters proper, are provided with wheels, but frequently in car construction they are without wheels, and are then by custom of the trade still called casters (fixed or rigid casters), although properly not such.

CHALLENDER TRUSS. A substitute for the truss plank and side body bracing of passenger car frames, and used on the Chicago, Burlington & Quincy Railroad. It consists of a thin plate of iron with an angle iron riveted to the bottom, and sometimes one at the top and bottom. It is fastened to each post by large wood screws and is bolted to the side sills. It is sometimes made to serve as a substitute for truss rods under the car, and it forms a part of the inside finish under the window. Cars trussed in this way are said to be as light and cheap as those in which the ordinary form of construction is used, but the truss has not so far found sufficient favor to be adopted as standard, not even by a few roads.

CHAMBER. See, DUST GUARD CHAMBER.

CHANDELIER. A center lamp having two or more burners, but generally meaning only those of very elaborate form or having more than two burners, as the two and four light chandeliers, FIGS. 2694-95.

CHANNEL BAR. A general term applied by makers to iron rolled with the following section: [. They are in use for the side sills of iron frame cars, for transoms and spring planks of trucks. I BEAMS, which see, are used for inside sills of under frames and for truck bolsters, etc.

CHAPLET. A piece of iron used in a mold for casting, to hold a core in its place.

CHAPMAN JACK. FIGS. 2970-71. See, SCREW JACK.

CHECK CHAIN. 68, FIGS. 3781-3951 and 3856-57. A chain attached to a truck and the body of a car to prevent the former from swinging crosswise on the track in case of derailment. Such chains are usually attached either to two or to each of the four corners of a truck and to the sills of the cars.

At the eighth Annual Convention, Cincinnati, 1874, it was

"Resolved, That truck and car body check chains are, when properly applied, a valuable acquisition on passenger equipment, and your committee recommend their general use." In 1893 the use of truck and car body check chains, properly applied, was adopted as a Recommended Practice.

A difficulty with check chains has been that the eyes by which they are attached to the body and truck were not strong enough to resist the strain, and that the chains themselves have been too long to come to a bearing soon enough to have the trucks controllable.

CHECK CHAIN CHAFING PLATE. A plate attached to a truck timber to resist the wear of a check chain.

CHECK CHAIN EYE. 70, FIGS. 3781-3951. See, BODY CHECK CHAIN EYE. TRUCK CHECK CHAIN EYE.

CHECK CHAIN HOOK. 69, FIGS. 3781-3951. See, BODY CHECK CHAIN HOOK. TRUCK CHECK CHAIN HOOK.

CHECK GAGE (for Mounting Wheels). FIG. 4368. The check gage for mounting wheels shown was adopted as standard in 1894. The gage is shown as applied, in one position, to a pair of standard wheels mounted to standard distance, and it is important that such gage be universally used after September 1, 1894, in mounting wheels, in order to have them pass inspection at interchange points.

CHECK VALVE (Triple Valve). 15, FIGS. 910, and 117, FIGS. 960-62.

CHECK VALVE CASE (Triple Valve). 13, FIG. 910. See above.

CHECK VALVE CASE GASKET (Triple Valve). 14, FIG. 910. See above.

CHECK VALVE SPRING (Triple Valve). 12, FIGS. 910, and 118, FIGS. 959-62.

CHICAGO CAR COUPLER. FIGS. 1464-72.

CHICAGO CAR ROOF. FIGS. 1727-37. An inside metallic iron roof made up of an inside layer of boards, a covering of sheets of corrugated sheet iron and an outer roof of boards.

CHICAGO GRAIN DOOR. FIGS. 1073-86. One of several grain doors, which slides up and down on a grain door rod fastened to the door post, and is hung to the carlines when not in use. The top of the door is fastened to the rods by a ring and a door arm.

CHILL. A kind of crystallization produced when melted cast iron is cooled suddenly. It is usually accomplished by bringing the molten iron in contact with a cold metal (usually iron) mold. The hardened part of a car wheel is called the chill. The mold in which a chill is produced is sometimes called a chill, but the name chill mold has been given to this.

CHILL CRACK. An irregular crack developed in casting upon the chilled surface of the tread of car wheels. Chill cracks not over ⅛ in. wide, and not extending to the flange, are not considered as injuring the wheel or as indicating weakness or inferior quality. Iron which makes the most durable car wheels is most liable to chill cracks. See, WHEEL SPECIFICATIONS, INTERCHANGE OF TRAFFIC.

CHILLED CAST IRON WHEEL. FIGS. 4217-24.

CHIMNEY (for Lamps). FIGS. 2678-86. See, LAMP CHIMNEY for table of standard dimensions. See also,

GLOBE CHIMNEY. SMOKE PIPE.
LAMP CASE CHIMNEY. STOVE PIPE.
LAMP GLOBE CHIMNEY.

CHIPPING (of Chilled Car Wheels). A scaling off of small portions of the chilled metal, due to imperfect or irregular crystallization. Wheels chipped on the tread to a depth of more than ½ in. or leaving the tread less than 3½ in., are rejected under rules for interchange of car. See, WHEELS.

CHOCK OR CHOCK PIECE. "In shipbuilding a wedge or triangular shaped block or timber used to unite the head and heel of consecutive timbers."—Century. Also intended as a filling piece to give form or shape. Hence in a snow plow a timber which joins successive timbers, and fills out to give shape.

CHORD (of a Truss). The long horizontal members at top and bottom of a truss. The side sills and plates of a car body are top and bottom chords of the side trusses, but the terms are not used in car building. In England the chords are termed booms.

CHRISTENSEN AIR BRAKE. FIGS. 986-87. A system essentially the same as the Westinghouse for use on electric cars. The air is compressed by a motor driven compressor under the car. All the other parts for the automatic and straight air system operate in the same manner as the systems in use on steam roads.

CHRISTIE BRAKE SHOE AND HEAD. FIGS. 4295-4302. One of the many forms of this detail in which combined strength and convenience of removal have been sought. It has been adopted as standard by the M. C. B. Association. See, BRAKE BLOCK.

CHUTE (Baker Heater). FIG. 2185. The interior frame of the feed door forming a passage for the fuel.

CIGAR HOLDERS. FIG. 3458.

CIRCUIT BREAKER. FIG. 4880. A device for automatically opening the circuit from the trolley or third rail shoe to the controller when the current exceeds a predetermined amount. It is usually provided with magnetic blowout.

CIRCULATING DRUM (Baker Heater). FIGS. 2208, 2222, 2224. A cast iron vessel with hemispherical ends, on top or inside of the car, filled with water, and connected by two pipes with the coil in the stove and with the pipes which extend through the car. As the water in the coil becomes heated it ascends to the drum, and from there it descends through the other pipe to the radiating pipes in the car. After passing through them it is brought back by return pipes to the coil, when it is again heated. Thus a continuous circulation is kept up. It is also called the expansion drum. There are several styles, among them the upright, FIG. 2222; the horizontal, FIGS. 2208, 2224, etc.

CIRCULATING PIPES (Baker and Other Heaters). FIG. 2287. A general name for the pipes which carry the steam or heated fluid through the car and return it again to the heater. The term radiating pipes is also used.

CIRCUMFERENCE MEASURE (M. C. B. Standard). FIGS. 4288-91. A steel tape measure specially designed to measure the circumference of car wheels.

CLAMP. 1. "In general, something that fastens or binds a piece of timber or of iron used to fasten work together."—Webster.

2. (Joinery.) "A frame with two tightening screws, by which two portions of an article are tightly compressed together, either while being formed or while their glue joint is drying."—Knight. See, DECK SASH QUADRANT CLAMP, DECK SASH PIVOT CLAMP, PLATFORM TIMBER CLAMP, RIDGE CLAMP.

CLEANING AIR BRAKES. In 1902 the following method for cleaning air brakes was adopted as the Recommended Practice of the Association:

Inspection and Cleaning of Triple Valves.—The triple valve should be removed from the car for cleaning in the shop, and should be replaced by a triple in good condition. It should be dismantled, and all the internal parts, except those with rubber seats and gaskets, immersed in kerosene oil to soften the accumulated oil and gum. No hard metal should be used to remove gum or dirt, or to loosen the piston packing

ring in its groove, as the almost inevitable result will be damage to some vital part of the triple. Particular pains should be taken in cleansing the feed groove not to enlarge it. Rags, or, better still, chamois skins, should be used rather than waste, as the latter invariably leaves lint on the parts on which it is used. Great care must be used in removing the emergency valve seat, as this is frequently found bruised and distorted in triples which have been cleaned. The working parts should be carefully examined to know that they are in good order. Particular attention should be given the triple piston packing ring. It should have a neat fit in its groove in the piston, and also in the triple piston bushing. The fit of the packing ring in its groove and bushing and the condition of the bushing should be such as to pass the prescribed tests. The graduating stem should work freely in its nut, and the graduating spring be of standard dimensions and free from corrosion. The slide valve, triple piston packing ring and bushing should be lubricated with a few drops of light bodied, high grade mineral lubricating oil, such as dynamo oil; but the emergency piston, valve and check should not be oiled.

Should the triple piston packing ring need to be renewed, or the bushing require truing, we strongly recommend that such work be done by the manufacturers. We are thoroughly convinced that the average workman cannot, or at least does not, do work of this kind satisfactorily, and that by far the largest proportion of the attempts to economize in this way results in inefficient air brakes and slid, flat wheels. It also permits a departure from the maintenance of standards in the several parts, which cannot but result in demoralization in repairs.

Usually, sufficient attention is not paid to the condition of the emergency parts of the triple, as shown by their condition. The emergency valve seat is found damaged, the stem bent, the rubber seat imperfect and the check valve not properly fitting in a number of cases. These facts account for a large number of slid, flat wheels.

The cylinder cap gasket and check valve case gasket should be carefully examined and cleaned by using a cloth. They should not be scraped with a metal tool. Judging by an examination of a number of triples, these gaskets should be renewed more frequently than they are.

Before assembling the parts after cleaning, the casings and body of the triple should be thoroughly cleaned out with a blast of compressed air. In taking down and replacing the emergency parts of the triple, the greatest care should be exercised not to injure any of them. More damage is done by careless workmen in taking down these parts than is done in replacing them.

When replacing the triple valve on the auxiliary reservoir, the gasket should be fitted to the triple instead of the reservoir. Home made gaskets should be avoided, and standard gaskets of the manufacturer be used. Reports have been made where triple pistons have been found bent, due to the use of gaskets of irregular thickness, and trouble has been experienced in using gaskets which are too thick or too thin.

Cleaning and Inspection of the Brake Cylinder.—The brake cylinder need not be removed from the car for cleaning. First secure the piston rod firmly to the cylinder head; then, after removing the cylinder head, piston rod, piston head and release spring, scrape off all deposits of gum and dirt with a narrow putty knife or its equivalent, and have the removed parts wiped with waste saturated with kerosene or other light oil. The packing leather should never be permitted to soak in kerosene oil, as the penetrating qualities of kerosene reach into the pores of the leather, and force out the life giving qualities of the special oil in which the leather is treated by the manufacturer. Particular attention should be paid to cleaning the leakage groove and the brake cylinder tube. The packing leather and expander ring should receive their share of proper inspection and cleaning. The expander ring should be of a circumference which shall fit the bore of the brake cylinder when the ring is removed from its place between the follower and packing leather and entered in the cylinder. In all cases the follower nuts should be drawn up snugly before replacing the piston, and the inside of the cylinder and the packing leather evenly coated with a suitable grease or vaseline. A goodly quantity of grease should be placed on the expander ring and the adjacent side of the packing leather, thus permitting the pressure to force the grease into the leather and giving it greater life.

No sharp tool should be used in getting the packing leather into the cylinder. After the piston is in place and before the cylinder head is fastened on, the piston rod should be slightly rotated in all directions about three inches from the center line of the cylinder, in order to be certain that the expanding ring is not out of place. The old stencil marks should be removed. The auxiliary reservoir should be stenciled on both sides, with the date and place of cleaning, using white lead for the purpose; and if the car belongs to a foreign road, a repair card should be attached, as provided by the rules. The bolts or nuts holding the cylinder and reservoir to the car should be tightened.

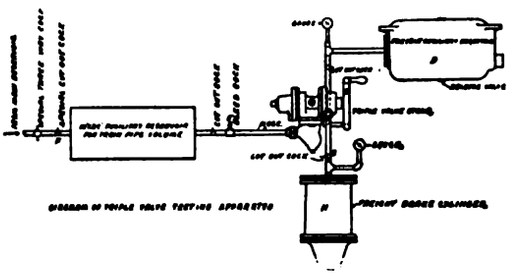
Testing Triples.—After cleaning and repairing, it is essential that triples be tested and come within required limits, if a reasonable efficiency of the air brakes is to be maintained.

Test No. 1.—The tightness of the slide valve, the emergency and check valves and all joints should be determined by painting with soap suds.

Test No. 2.—Maintaining a pressure of ninety pounds in the train pipe, the auxiliary reservoir should reach seventy pounds in not less than forty-five seconds or more than sixty seconds, as provided for in Test No. 9 of the M. C. B. Air Brake Tests Code.

Test No. 3.—To test repaired triples for release, charge the auxiliary to seventy pounds pressure and make a full service reduction of twenty pounds, or until the auxiliary and cylinder pressure are equal. Place the special cut out cock in such position that pressure must pass through the 3-64 inch port, and turn main reservoir pressure of ninety pounds into the train pipe. If the triple does not release under these conditions it should be condemned.

Test No. 4.—The triple piston packing ring should be tested for leakage by blocking the piston in the graduating position, preferably by use of the device shown at "A" in the accompanying diagram, main-



taining the drain pipe pressure at seventy pounds. Under these conditions the pressure in the auxiliary reservoir should not increase faster than fifteen pounds per minute.

CLEARANCE CAR. A car with a light frame built out on all sides to the extreme width and height required for any car that is to pass over the road. It is run over the road first to ascertain if the car can with safety be sent over the road. The car may also be used to ascertain what is the maximum cross section of tunnels, bridges, etc., over a road so that cars can be built within the limits determined by the car.

CLEAR STORY. 110, FIGS. 360-72, 388-91. "An upper story or row of windows in a church, tower, or other erection, rising clear above the adjoining parts of the building."—Webster. Also spelled clere story. Hence the portion of a passenger car roof which rises above the roof proper, in the manner which is now customary in nearly all American passenger cars, has been termed the clear story, and this name was exclusively used in the former edition of this dictionary. Since the issuing of the first edition the use of the term deck for clear story seems to have become practically universal among car builders and manufacturers, especially in compound words. As a general name for designating the entire space included within the upper deck, however, the term clear story is frequently used. The clear story was first used in American car framing about 1860. The part corresponding to a clear story in freight cabooses is termed a lookout.

CLEARANCE (of Track Gage). The total difference between the gage of the rails and the gage of the exterior bearing surface of the flanges is at present fixed at about ⅜ of an inch, as adopted in June, 1894. See, FIGS. 4367-69. The method of testing wheels for this purpose has been by measuring the distance in the clear from inside to inside of car wheel. By resolution of the Master Car Builders' Association, 1883, the standard distance for flanges was fixed at 4 ft. 5⅜ in. The limit of ⅛ in. either way from 4 ft. 5⅜ in. was adopted in 1885. In 1894 a standard check gage for mounting wheels was adopted (see, FIG. 4366) which is intended to make the clearance of flanges a fixed distance. The relation of wheel gage to track and guard rails is shown in FIGS. 4367-68.

CLEAT. "1. A narrow strip of wood nailed on in joinery. 2. A term applied to small wooden projections in tackle to fasten ropes by."—Webster.

CLEVELAND TURNBUCKLE. FIG. 2968. See, TURNBUCKLE.

CLEVIS. "A stirrup shaped metallic strap used in connection with a pin to connect a draft chain or tree to a plow or other tool."—Knight. The term is applied to various kinds of irons resembling a plow clevis in shape, and also to bolts with forked ends. See, BOOM CAP CLEVIS. BRAKE LEVER CLEVIS. DRAW CLEVIS. HOISTING BLOCK CLEVIS.

CLINCH NAIL. A wrought iron forged nail, so named because it can be bent or clinched without breaking. Cut nails, the common and cheapest kind, although of wrought iron, will not clinch.

CLIP. A U shaped strap for attaching any body, more particularly a pipe, to the side of a partition. See, BERTH SPRING CLIP, DECK SASH QUADRANT CLIP, PIPE CLIP.

CLOSE RETURN BEND. FIG. 2275. A short cast iron tube made of a U shape, for uniting the ends of two wrought iron pipes. It differs from an open return bend in having the two branches in contact with each other.

CLOSED CAR (Street Cars). Generally a car with end doors, and the sides closed by the car panels or sheathing, and windows, so that the passengers are protected from the wind and weather.

The term is used for a winter car to distinguish it from an open or summer car, in which the seats are usually transverse to the car, the sides open, except for curtains.

CLOSED DOOR STOP (Freight Car Doors). 72, FIGS. 159-69. A block of wood or iron to prevent outside sliding doors from moving too far when they are closed. See also, OPEN DOOR STOP.

CLOSET. 1. A small room, usually for storage. See, LINEN CLOSET, WINE CLOSET, etc. A locker is a closet of less than the full height of the car, but this distinction is not always observed.

2. A retiring room for sanitary purposes, more commonly called a SALOON, which see.

CLOSET HOPPER. FIGS. 3091-95. Also called soil hopper. A metal or porcelain hopper used in saloons.

CLOSET HOPPER VENTILATOR. FIG. 3103. See, BELL'S EXHAUST HOPPER VENTILATOR.

CLOUD STEEL TRUCK FRAMES. FIGS. 4082-83.

CLUSTERS (Pintsch Lamps). The four flame cluster, No. 227 (FIG. 2520), is the one ordinarily used in center lamps. Where a large amount of light is required, as in compartments having but one lamp, five or six flame clusters (Nos. 228, 229) may be used. Where a small amount is needed, as in central corridors at ends of cars, two flame clusters (No. 226) may be used.

For vestibule lamps the two flame cluster (No. 226A, FIG. 2522) is required. Four flame vestibule lamps use the ordinary four flame cluster (No. 227).

All clusters are provided with check screws, placed at the base of the burner arm, by means of which the flow of gas to each burner can be regulated. These check screws are locked in place by small nuts.

CLUSTER STEM (Pintsch Lamp). 305, FIGS. 2605-21.

CLUSTER STEM FLANGE (Pintsch Lamp). 305a, 305b, FIGS. 2605-21.

CLUTCH COUPLING. See, BRAKE HOSE COUPLING.

COACH. FIGS. 69-81, 141, 360-65. A term used to designate cars for the conveyance of passengers, in distinction from freight, baggage and express cars. By increasing usage the term is used as an equivalent for day car in distinction from sleeping cars as well as freight and baggage cars.

COACH BOLT (English). American equivalent, CARRIAGE BOLT, which see.

COACH SCREW (English). American equivalent, lag screw, but coach screw is also used. A square headed screw with a pointed end used to screw into wood.

COAL BOX. A box for carrying coal. It is usually a long narrow deep box, placed between the heater and the end of the coach.

COAL CAR. FIGS. 21-45, 239-324. A car especially designed for carrying coal. The standard cars built for coal service to-day are largely what are termed gondolas. They are from 27 to 36 feet long and carry from 60,000 lbs. to 100,000 lbs. They are usually designated by the character of the dumping devices applied, as drop bottom, hopper bottom, box hopper bottom, pyramidal hopper bottom, twin hopper bottom, etc. See,

DROP BOTTOM CAR. TWIN HOPPER CAR.
HOPPER BOTTOM CAR.

COAL FEED CHUTE (Baker Heater). FIG. 2185.

COAL HOPPER. See above and HOPPER.

COAT AND HAT HOOK. FIGS. 2929-50.

COAT HOOK. FIGS. 2951-55.

COCK. 4 and 6, FIGS. 2798-2800, and 2763-68. "A spout; an instrument to draw out or discharge liquor from a cask, vat or pipe."—Webster. See, FAUCET for the various forms; also

BIBB COCK. RESERVOIR DRAIN COCK.
COMBINATION COCK. SELF CLOSING COCK.
COMPRESSION FAUCET. STOP COCK.
DRAIN COCK. TELEGRAPH COCK.
DRAW OFF COCK. THREE WAY COCK.
MAIN COCK. VERTICAL TELEGRAPH COCK.
RELEASE COCK.

COCOA MATTING. Matting for the floors of cars made from the coir fiber, growing in East India and the east coast of Africa.

COIL (Baker Heater). FIGS. 2189, 2226-7, etc. An iron pipe

which is bent in a spiral form and placed in the fire, for heating water which circulates through the car.

COIL JACKET STEAM HEATING SYSTEM (Safety Car Heating System). FIGS. 2395-97. This system is primarily a system devised to meet the requirements of those who demand that all the jackets and circulation piping be retained entirely within the car. The principle is the same as indicated under the head of Standard Systems. The jackets are shown in FIGS. 2403-10; and in these the circulating water is heated by steam from the locomotive. See, SAFETY CAR HEATING CO.'S SYSTEMS OF CAR HEATING.

COKE CAR. FIGS. 244-45. A gondola car with extra high sides or a rack, made necessary by the light character of the load. Box cars are often used as coke cars.

COKE RACK STAKE POCKET. A stake pocket fastened to the side or end planks of a gondola car which are to take the stakes of a coke rack.

COLD SHOT. Small globules of iron resembling ordinary gun shot, which are found in the chilled portion of cast iron wheels.

COLLAR. 1. "A ring or round flange upon or against an object."—Knight. Ordinarily an axle collar, below, is meant. See,

DECK COLLAR. LAMP COLLAR.
DUST COLLAR. REDUCING COLLAR.
EXPANDING COLLAR.

2. (Of Journal.) FIGS. 4284-87. A rim or enlargement on the end of the car axle which takes the end thrust of the journal bearing.

COLLECTION OF SALT WATER DRIPPINGS. In 1898 the subject of rust on trucks and track from salt water drippings from refrigerator cars was discussed, and a Recommended Practice for the collection of such drippings was adopted. See FIGS. 4529-30.

COLLINS BRAKE HEAD. The shoe is fastened by a dove tail, which is wedge shaped. Not now used.

COLOR COAT (Painting). The coats which follow the rough stuff or scraping filling coat in painting passenger car bodies. It is applied before the lettering and striping. The colors are mixed with turpentine and dryers, as little oil as possible being used, only sufficient to prevent the color from rubbing off. Twenty-four hours are allowed to each coat to dry, and the processes of lettering, striping and varnishing then follow, which vary greatly in the time and care given to them, but which are always very carefully done. See, FINISHING VARNISH and PAINTING.

COLUMN. 1. (Diamond and Other Trucks). 37, FIGS. 3735-53. Another and perhaps more common name for a BOLSTER GUIDE BAR, which see.

2. (Of Crane). Another name for the mast, especially when entirely supported from below.

COLUMN BOLT. 109, FIGS. 3735-53. A bolt passing through the arch bars and holding the column in place and the truck frame together.

COMB AND BRUSH RACK OR CASE. FIGS. 2784-96.

COMBINATION BAGGAGE CAR. FIG. 120. A baggage car having compartments for express or mail, or both, as well as for baggage. See, COMBINATION CAR.

COMBINATION CAR. FIGS. 73-74, 78, 134. A passenger car, one portion of which is devoted to passengers and the other to the conveyance of mail, baggage or express. A COMBINATION BAGGAGE CAR, which see, is also a combination car.

COMBINATION COCK (Baker Heater). A cock with funnel attached, used at the top of a tank for filling. When opened with the key it allows the inward passage of the water, and at the same time the outward passage of air through a separate channel. Hence the name.

COMBINATION HOT AND COLD WATER FAUCETS. 6, FIGS. 2798-2800 and FIGS. 2768, 2801.

COMBINED TRIPLE VALVE, RESERVOIR AND BRAKE CYLINDER (Westinghouse Freight Brake). FIGS. 918-19. To lessen the complication and reduce the cost of freight brake gear these three parts, which are separate in passenger brake gear, are combined in freight.

COMMERCIAL ACETYLENE SYSTEM OF CAR LIGHTING. Details, FIGS. 2657-62. This system uses acetylene gas stored in tanks filled with asbestos and charged with 4-10 of the volume of acetone, a colorless liquid obtained from the dry distillation of wood which absorbs large quantities of acetylene under pressure. When the pressure is relieved the acetylene is given off and the acetone remains in the tank and may be used over again on recharging; 3,500 cu. ft. of acetylene may be stored under a pressure of 240 lbs. in a 10 ft. x 20 in. tank and may not be exploded by any known means when in the tanks filled with asbestos bricks. Such a supply is sufficient for more than one month's lighting of an ordinary car. The gas is generated in stations at terminals, and the tanks, when empty, are replaced by full tanks supplied from the charging stations. The lamps and piping for the car are practically the same as the Pintsch.

COMMINGLER STORAGE SYSTEM OF CAR HEATING (Consolidated Car Heating Co.). FIG. 2324. A small commingler is placed under the middle seats on each side of the car, between the floor of the car and the deafening ceiling. The outflow connection of this commingler is the side piping, and the other end, forming the return, is connected with a valve, and thence into the base of the commingler. A complete circuit is thus established, through which a continuous flow of water may take place, as shown by the arrows. The overflow, through which surplus water is removed from the system, is connected with the fitting, which is placed at the highest point in the system, 3K. When the pipes are entirely filled, the surplus water flows from this fitting through the restricted opening in the trap cock, and thence down through the channel way, 3A, cast in the base of the commingler, and out at the drip pipe. The connection of the overflow pipe to the base of the commingler is made to prevent possibility of freezing of the drip pipe in cold weather. When the pipes are filled with water of condensation all surplus is carried off through the overflow pipe. The entire system is quickly emptied of water, and the car is then ready to stand out in the cold without danger of freezing, and it is also ready to be quickly heated by direct steam when again brought into service.

COMMINGLER SYSTEM OF CAR HEATING. FIGS. 2319-23. See, MCELROY'S COMMINGLER SYSTEM.

COMMODE HANDLE (English). Nearest American equivalent, body hand rail. A piece of brass or iron secured to the sides of the body, and shaped so as to be conveniently grasped by the hand in entering and leaving carriage or in passing along the train outside the carriages.

COMMON SENSE BOLSTER. FIGS. 799-802. A type of bolster having a top and bottom plate of wrought iron and a center filling piece of steel.

COMMUNICATION CORD PULLEY (English). American equivalent, bell cord pulley. A small brass pulley fixed to the eave of the roof and carrying the communication cord (bell cord) running outside the train.

COMMUTATOR. FIG. 4840. See, ARMATURE.

COMPARTMENT. A subdivision of a passenger car. In English carriages it runs entirely across the car. In American parlor and sleeping cars, in which alone compartments often occur, it runs only partially across, leaving room for a passage or corridor at the side Often called STATEROOMS, which see.

COMPARTMENT SLEEPING CAR. FIGS. 97-99, 127. A sleeping car which is divided into staterooms all opening into a common corridor which runs the whole length of the car. See, SLEEPING CAR.

COMPO BRAKE SHOE. FIGS. 1022-24. A brake shoe of soft cast iron with cork inserts.

COMPOSITE CARRIAGE OR COMPOSITE (English). A coach in which compartments for more than one class of passengers are provided. A compartment for baggage is generally included.

COMPOSITE END FRAMING. FIGS. 433-35. A type of framing adopted by the Vanderbilt system of railroads, which combines iron and wood, in the sills, posts, plates, etc. The sills and plates of the body and deck consist of two pieces of wood with an iron or steel flitch plate between, the three pieces being bolted together as one. To these iron flitch plates and mortised into the wood flitch planks of the sills and plates are bolted or riveted upright iron posts. These iron posts are also sandwiched between wood studs, making a composite post of great stiffness and strength. The end plate is also strengthened in the same manner, as are all the important members of the car body frame.

COMPOSITE END POST. See, COMPOSITE END FRAMING.

COMPOUND BOLSTER. A bolster composed of one or more sticks of timber stiffened with vertical plates of iron.

COMPOUND CARLINE. 100, FIGS. 360-72, 385-87, 388-91. A carline, of which the main or central portion is made of wrought iron, with a piece of wood on each side. They are commonly used for cars with clear stories, and either extend directly from one plate to the other or are bent to conform to the shape of the clear story. In the latter case they are called profile carlines. See, CARLINE.

COMPRESSION BAR. See, BODY BOLSTER COMPRESSION BAR.

COMPRESSION BEAM. 163, FIGS. 360-72, 385-87. A horizontal timber in the center of the side of a car body, which acts as the compression member of a truss for strengthening the body. The compression beam brace abuts against it. An end compression beam is sometimes used. The compression beam is sometimes made double, one above the other, with separate braces (main compression brace and center compression brace) acting upon each.

COMPRESSION BEAM BRACE. 164, FIGS. 343-48, 360-72, 385-87. A brace used in connection with a compression beam to form a truss in the side of a passenger car. It is sometimes stiffened by a center counterbrace, 165; and sometimes two or more braces are used. It is then termed main compression brace.

COMPRESSION FAUCET. FIG. 2769, and 4, FIGS. 2798-2800. A spring faucet with a flat disk on top, letting on the water by direct vertical compression. TELEGRAPH COCKS, which see, are in a sense compression faucets, but are not so called.

COMPRESSION MEMBER. Any bar, beam, brace, etc., which is subjected to strains of compression, and forms part of a frame truss, beam, girder, etc. Struts, body braces, etc., are compression members. Similarly a tension member is used for tensile strains.

COMPRESSION ROD BRAKE. An inner hung brake with a single lever which is connected with a brake beam farthest from it by a rod or bar which is subjected to a strain of compression when the brakes are applied. The pressure on the brake blocks is not equal.

CONCEALING URINAL. One designed to be opened for use by a handle at the top, and then closed up flush with the woodwork so to be invisible. They are in limited use, but not generally approved.

CONCEALING WATER CLOSET. A form of closet covered with a seat to resemble an ordinary chair or sofa.

CONDENSING DIAPHRAGM (Refrigerator Cars). Sheets of metal placed in the cold air flue on which moisture may be precipitated.

CONDUCTOR (Refrigerator Car). The drip pipe from the ice pan. See also, HEAT CONDUCTOR.

CONDUCTOR'S CAR. A CABOOSE CAR, which see.

CONDUCTOR'S LANTERN. FIGS. 2730-37. One with an extra sized bail attached to it by which it can be held on the arm, leaving the hands free. It is sometimes provided with a reflector. They are often elaborately finished, and sometimes bear the name of the conductor cut on the globe.

CONDUCTOR'S VALVE (Westinghouse Brake). FIG. 942. A valve for applying the train brakes placed at some convenient point in a car, usually in the saloon.

CONDUCTOR'S VALVE DISCHARGE PIPE (Westinghouse Brake). A pipe leading from the conductor's valve down through the floor of the car.

CONDUCTOR'S VALVE PIPE (Westinghouse Brake). Connects the brake pipe with the conductor's valve.

CONDUIT PLOW. FIGS. 4834, 4875. A collecting device used with the open conduit system, consisting of metal contact shoes mounted upon a thin steel carrier, and designed to make contact with two insulated contact rails located in a conduit between the running rails. Copper leads through the steel carrier connect the shoes to the car wiring. The plow is supported by the trucks in such a manner as to allow lateral motion to permit its readily following the conduit slot.

CONE AND APRON VENTILATOR. FIG. 3484. See, VENTILATORS.

CONE CAP VENTILATOR. FIG. 3483. See, VENTILATORS.

CONE LAMP SHADES. FIGS. 2687-89. See, LAMP SHADE.

CONED CLOSET HOPPER. FIGS. 3093-94. See, CLOSET HOPPER.

CONGDON BRIDGE BACK BRAKE SHOE. FIG. 1021. A shoe with soft cast iron body and wrought iron inserts and a steel bridge back. Especially adapted for use on chilled wheels.

CONNECTING CHAIN (Steam Shovel). A PITCH CHAIN, which see, connecting the pitch gear on the two axles of a truck, used for making the car self propelling.

CONNECTING RAIL. 48, FIGS. 3151-52. The wood or metallic bars that join the wall and aisle ends of a seat.

CONNECTING ROD. 1. A rod which connects two or more parts or objects together. See, BRAKE SHAFT CONNECTING ROD. FLOATING LEVER CONNECTING ROD. CAR SEAT CONNECTING ROD.

2. (Hand Car.) 24, FIGS. 4722-27. The iron rod which connects the bell crank and the crank shaft together.

CONSOLIDATED CAR HEATING SYSTEMS. FIGS. 2288-2324 Several systems of car heating, including a DIRECT STEAM SYSTEM, a MULTIPLE CIRCUIT DRUM SYSTEM, the MCELROY COMMINGLER SYSTEM and the COMMINGLER STORAGE SYSTEM, all of which see.

CONSOLIDATED STEAM HOSE COUPLING. FIGS. 2311, 2314. A straight port coupling used on Consolidated Car Heating Co.'s equipments.

CONTACTOR. FIG. 4837. See, CONTROL SYSTEM.

CONTINUOUS BASKET RACK. 17, FIG. 1782 and FIGS. 2987-98, 3002-03. See, BASKET RACK.

CONTINUOUS BRAKE. A system of brakes so arranged that by connecting together the brake apparatus on the different vehicles forming a train it can be operated on all of them from one or more points on the train, as from the engine or from any of the cars. See,

AIR BRAKE. WESTINGHOUSE AUTOMATIC AIR BRAKE.
EAMES VACUUM BRAKE.
NEW YORK AIR BRAKE.

CONTINUOUS CARLINE. A CARLINE, which see, which passes directly from side to side of the car, across and under the clear story or upper deck, in distinction from a profile carline, which is bent to follow the outline of the clear story.

CONTINUOUS COUNTERBRACE ROD. The body counterbrace rods are sometimes combined into one long rod passing from one end of the car to the other, which is then sometimes termed a continuous counterbrace rod; also, overhang truss rod, inverted truss rod, or hog chain rod.

CONTINUOUS DRAFT GEAR. A draft gear, having a continu-

ous rod or rods extending throughout the length of the car from the drawbar at one end to the drawbar at the other end, whose office is to transmit the tractive strains and relieve the draft timbers. The American is the type most frequently met.

CONTINUOUS TOP SIDE (English). Nearest American equivalent, top side rail. A side board run continuously from end to end of a wagon in order to stiffen it vertically and assist in tying the ends together.

CONTINUOUS TRUCK FRAME. An iron bar which is welded together in a rectangular shape so as to form the sides and ends of a truck frame.

CONTROL SYSTEM (Type M., Gen. Electric Co.). FIGS. 4835-38, 4874. A system of control where one or more controllers are operated from a distance.

This system has been developed with special reference to the operation of a train consisting of several motor cars coupled together, all motors being controlled simultaneously by a single operator. Each motor car is equipped with a motor controller, one or two master controllers, and control couplers, together with such other apparatus as switches, fuses, rheostats, etc., as constitutes a complete operative motor car equipment.

The motor controller consists of a number of electrically operated switches, called "contactors," which close the various power and motor circuits, and which carry only the current for the operating coils of the contactors. These latter are designed to open the motor circuit contacts by gravity, and are provided with an efficient magnetic blowout for quickly and positively disrupting the arc thus formed. The motor controller also includes an electrically operated reversing switch, called "reverser," the function of which is to connect the motor armatures and fields in the proper relations for giving forward or backward movement of the car. The reverser consists of a drum having two positions and carrying the necessary contacts for engaging fixed contact fingers, together with two operating coils, one for throwing the reverser to each position. The operation of this reverser is also effected by the master controller.

The master controller is similar in construction to the ordinary hand controller, but very small and easily operated. It is provided with separate operating and reversing interlocked handles, and has a magnetic blowout for disrupting the arcs formed on opening the control circuit connections.

The combinations of motors, rheostats, etc., effected by the motor controllers are the same as those accomplished by ordinary hand controllers, giving series and parallel operation of motors and two economical running speeds. (See, CONTROLLER.)

Where several cars are coupled in a train the control circuits of the various cars are joined together by means of couplers located at the end of each car, so that all motor controller operating circuits and all master controllers are connected together, making all of the motor controllers operative from any master controller. The cars may be coupled into a train without reference to their relative positions, and either end of any car may be coupled to any other car in the train.

The couplings for connecting the control circuits between cars consist of a coupler socket fixed to the end of the car, and a jumper consisting of two coupler plugs connected by a multiple cable. The coupler sockets and plugs contain corresponding metal contacts for the connection of the electrical circuits.

A cutout switch is provided on each car, by means of which damaged motors or motor controllers may be disconnected from the energizing circuits.

CONTROLLER. FIGS. 4823-24, 4837-38. An electric switching mechanism for controlling the speed and direction of rotation of electric motors. It includes the necessary movable and fixed contacts for connecting the motors to the power circuit and to a variable resistance in the combinations necessary for starting, accelerating and reversing the car. Practically all railway controllers are of the series parallel type, arranged to connect the motors first in series with each other, and then in parallel across the power circuit, giving two running speeds. While accelerating to these speeds, variable resistances introduced into the circuit prevent undue rise of current.

The controller consists of a main cylinder, carrying the necessary contacts insulated from the shaft and from each other for engaging with fixed contacts or fingers, thus effecting the required electrical connections for placing motors either in series or in parallel, and regulating the resistances in series with them. A reversing cylinder makes the necessary connections for reversing the direction of rotation of the motors. The arcs formed on opening the circuits are disrupted by a magnetic blowout. The controller is enclosed in an iron casing, which protects all parts and serves to attach it to the car framing. One controller is usually located on each platform of the car, which can be operated from either end. See, CONTROL SYSTEM.

CONVERTIBLE CAR (Electric). FIGS. 4731-34, 4750-52, 4759-61. A type of car which may be readily converted from a closed car to an open car. The seats are arranged crosswise and the side of the car is made up of panels between the posts. When it is desired to change the car from closed to open the panels and sash are raised into pockets under the roof, as shown in FIGS. 4759-61. See, SEMI-CONVERTIBLE CAR.

COPE. The upper portion of a mold or flask used in making metal castings.

COPING (English). A bar of iron secured to the top of the sides and ends of a gondola car (open wagon), and protecting them from local distortion and the friction of a chain or any heavy body.

CORD. "A string or small rope composed of several strands twisted together."—Webster. See, BELL CORD.

CORK WALL (Refrigerator Cars). One of the means of insulation.

CORNER ANGLE POST. A corner post which consists of an angle bar, usually in combination with a wooden post.

CORNER BRACE (Street Car). A diagonal floor timber between the end sill and transverse floor timber.

CORNER CASTING. A KNEE IRON, or a CORNER PLATE, which see. See also, ROOF CORNER CASTING.

CORNER HANDLE. More commonly a HAND HOLD or a GRAB IRON, which see. 102, FIGS. 159-69.

CORNER PILLAR (English). American equivalent, corner post. An upright piece at the corners of the body.

CORNER PLATE. 1. (Freight Car Bodies.) 55, 56, 57, FIGS. 159-69, 185-95. A wrought or cast iron angle plate or knee on the outside corner, to strengthen and protect the frame. There are usually three corner plates, upper, lower, and middle. Very commonly a push pole corner iron or push block, 191, FIGS. 159-69, is cast upon the lower corner plate.

2. (Pullman End Framing.) An angle iron applied to the corner of a stick of timber (the deck end plate) to keep it from abrasion and to strengthen it.

CORNER POST. 1. 43, FIGS. 159-69, 185-95, 215-22; 8, FIGS. 271-95; 61, FIGS. 360-72, 385-87. The upright stick which forms the corner of the frame of a car body.

CORNER POST AND BRACE POCKET. FIGS. 459-60.

CORNER POST KNEE IRON. 1. (Pullman End Framing.) An angle brace used to connect the foot of the corner angle post to the side sill.

2. (Pullman Extended Vestibule.) An angle brace for the outside corner post of a vestibule resting upon the platform end sill.

CORNER POST POCKET. 45, FIGS. 159-69 and FIGS. 457-8. See, POCKET.

CORNER SEAT. A seat for the corner of a car, the back of which is not reversible. They are called left hand or right hand, as for a person sitting in them.

CORNER SEAT END. A seat end bracket secured to the wall of a passenger car for supporting the outer end of a CORNER SEAT, which see.

CORNER TRANSOM MUNTIN OR MULLION (Street Cars). A side mullion in the transom frame of an open car, to distinguish it from the center transom muntin.

CORNER URINAL. FIGS. 3110-12. So called in distinction from a side urinal.

CORNICE. 94, FIGS. 392-98. The moldings at the eaves of the roof outside of a car, and where the ceiling joins the sides and ends of the car inside. There is, therefore, an inside and outside cornice. See also, DECK INSIDE CORNICE. WINDOW CORNICE, etc.

CORNING SOFT INSERT BRAKE SHOE. FIGS. 1009 and 1012. A brake shoe of hard cast iron body with soft cast iron inserts.

CORRIDOR (Sleeping and Compartment Cars). FIGS. 98, 127. A passage running at one side of a car from one door to the other, affording access to the compartments. All sleeping, dining and private cars have longer or shorter corridors to pass the state rooms, smoking compartments, etc.

CORRIDOR CARRIAGE (English). A passenger vehicle having a passage from end to end along one side, the various compartments having doors which open into this passage. Little used. See also, CARRIAGE.

CORRUGATED KEY (YALE LOCK, which see).

CORRUGATED METAL CAR ROOF (Freight Cars). FIG. 1775. A roof consisting of iron, steel, or zinc plates covered with boards, and resting on roof strips on top of the rafters and carlines. See also, CAR ROOF.

CORRUGATED MOLDINGS. See, WAVED MOLDINGS.

CORRUGATED RUBBER FLOOR MAT. So called in distinction from perforated rubber floor mats.

CORRUGATED YALE LOCK. See, YALE LOCK.

CORTICINE. A form of floor covering much like LINOLEUM, which see, composed of linseed oil, prepared by a special process, mixed with ground cork and placed upon a strong backing of water proof canvas.

COUNTER BORING. An enlargement or other alteration of form, for a certain portion of its length, of a hole bored in any substance.

COUNTERBRACE. 37, FIGS. 159-69, 185-95; 55, FIGS. 360-72 and 165, FIGS. 343-48; 360-72, 385-87. In bridge building, a brace which carries a load in the opposite direction to a main brace, or resists the tendency to buckling of panel, when the shear due to dead load exceeds that of the live load. In car building, a counterbrace usually means a brace on the side of the body between its ends and the body bolster. Sometimes there are two styles of counterbraces: one, near the middle of the car, is alone a counterbrace proper, in the technical sense, and called center counterbrace; while the other is designated as the counterbrace or overhang brace, and generally the only counterbrace recognized in car building. See, BODY COUNTERBRACE.

COUNTERBRACE ROD. 37a, FIGS. 159-69, 185-95. An inclined rod which acts as a counterbrace. See above and also BODY COUNTERBRACE ROD.

COUNTERBRACE ROD PLATE WASHERS. 34b, 34c, FIGS. 159-69, 185-95, etc. Washers that rest upon the plate and receive the end of the counterbrace rod.

COUPLER. That which couples. In relation to cars the term usually designates the appliances for coupling or connecting cars together. The word is more appropriately applied to the automatic car coupler, which performs the act of coupling itself. The term is sometimes used to designate the coupling of steam pipes between cars, but this is unfortunate, as it seems desirable to maintain the distinction already established. To apply the term coupling to an M. C. B. automatic coupler would be an innovation, and it would seem equally so to call a steam hose coupling a coupler. See, AUTOMATIC FREIGHT CAR COUPLERS.

COUPLERS. (M. C. B. Specifications.) In 1899 the following specifications and tests for M. C. B. automatic couplers were adopted as Recommended Practice:

For drop testing machine and details see FIGS. 4711-13.

After January 1, 1902, all M. C. B. automatic car couplers purchased by or used in the construction of cars for the above named company must meet the requirements of the following specifications:

Couplers will be subject to the inspection and tests of the representative of the above named company, preferably at the works where they are made, as to their mechanical workings, general condition and strength. The inspection and tests to be made with the aid of gages and apparatus approved by the Association. Test couplers to be furnished free by manufacturers. Testing apparatus and assistance necessary to make satisfactory tests and inspection to be furnished free by the manufacturers when such tests are carried on at their works.

The bars, knuckles and locking pins, or blocks, must be accurately made to fitting gages prepared by the manufacturers, governing those dimensions which will insure that, when afterward assembled, parts taken at random will go together without adjustment or machining. When so assembled, knuckles and locking pins, or blocks, must work freely, but without so much lost motion between knuckle and bar as will permit more than 1-16 inch vertical play in the former, or between knuckle and lock as will permit knuckle to drop forward beyond the proper contour line; but ¼ inch to ⅜ inch lost motion in the opposite direction is not undesirable.

Couplers must conform to M. C. B. contour lines, dimensions and gages. They must couple and uncouple with each other (with either or both knuckles open) and with the master or sample coupler. They should unlock easily, and lock with freedom when knuckle is pushed in by hand. They must have complete locking fixtures, with lock set preferably within the head of the coupler. They must have steel pivot pins 1⅝ inches in diameter, and of a uniform length of 13¾ inches from under side of head to center of pin hole for ⅜ inch cotter. Pivot pins, after being heated and having ends struck up, must be carefully and properly annealed.

Bars will not be accepted if distorted by improperly matched flasks, or other defects due to molding or casting, and must be free from shrinkage cracks, cold sheets and blow holes. The coupling faces and bearing surfaces must be free from sand or scale. The coupling face must be square with axis of bar. The dimensions of the bearing surfaces of butt and its depth must not vary more than 1-16 inch from the standard. The back end of shank and the front faces of butt must be flat and square with the axis of bar. The front faces of butt must be free from sand wash in the corners. The dimensions shown on standard drawing of that part of shank lying between butt and head of coupler are maximum, and must not be exceeded. The holes for pivot pin in lugs of bar must be drilled, or, if cored, must be broached out so as to be not more than 1 21-32 inches diameter. They must not only be in line with each other, but their common center line must be parallel to face of bar and at right angles to its axis.

Knuckles must conform to manufacturers' fitting gages and to M. C. B. knuckle gage, so as to fit properly in coupler head and insure strict adherence to the M. C. B. contour. They will not be accepted if distorted by improperly matched flasks, or other defects

caused by molding, and must be free from shrinkage cracks, cold shot and sand, scale or blow holes. The pivot pin hole must be drilled, or, if cored, must be broached out so as to be not more than 1 21-32 inches diameter. It must be parallel to face of knuckle and at right angles to its axis.

The name of the coupler and class of bar must be cast upon the top side of head of bar, in letters and figures ¾ inch long and raised 1-16 inch. Each coupler must also have plainly cast upon it the Master Car Builders' standard label of dimensions and size, and in the location as shown in detail on drawing which forms a part of these specifications. Each knuckle must have the serial number of class or style and maker's mark cast upon it at some point where it will not be worn off.

The weight of each complete coupler having 5 by 5 inch shank to be not less than .... pounds; of each coupler having 5 by 7 inch shank to be not less than .... pounds. Each knuckle to weigh not less than .... pounds. As many couplers and knuckles as possible must be cast from each heat of steel or melt of iron used. All parts to be well annealed throughout.

The representative of the railroad company, having inspected the couplers offered, shall proceed to test from such as he accepts, selecting for test as follows: One complete coupler shall be taken at random by him from each lot of one hundred couplers accepted, or from each accepted heat of steel cast (for malleable iron, from each annealing heat), it being optional with the manufacturer which method is pursued.

The coupler shall be subjected to test No. 1, hereafter specified. If the coupler fails to stand the prescribed test, but before failing stands a sufficient number of blows to make a retest admissible, a second coupler shall be taken from the same lot from which the first coupler was taken. If it stands the test, that lot of couplers will be accepted as far as test 1 is concerned. Otherwise, that lot will be rejected and another lot substituted and tested in the same way.

From each 1,000 couplers accepted by test 1, five complete couplers shall be selected by the inspector, one of which shall be subjected to test 2, two to test 3, and two to test 4, hereafter specified.

If any coupler, or pair, fails to stand the prescribed test, but before failing stands a sufficient number of blows to make a retest admissible, a second coupler, or pair, shall be taken from the same lot from which the first five were taken. If it (or they) stand the test, that lot of couplers will be accepted. Otherwise that lot will be rejected and another lot of 1,000 couplers substituted. Any part of any coupler which has been subjected to test is condemned for retest and for service.

List of tests to which couplers shall be subjected:

1. Striking test on closed knuckle of complete coupler, covering lots of 100 each.
2. Guard arm test, covering lots of 1,000 each.
3. Jerk test, covering lots of 1,000 each.
4. Pulling test, covering lots of 1,000 each.

Test 1.—Striking Test on Closed Knuckle of Complete Coupler. As a preliminary, coupler is to be marked on bottom with a center punched line parallel to axis of shank, the line being extended to inner face of knuckle; coupler is then rigidly held in a vertical position in machine with steel fillers and wedges, the latter sledged down tight, and this sledging operation repeated after each blow, with its axis in center line of drop, pivot pin hole parallel to line through centers of legs of machine and butt resting solidly on anvil. Blows to strike directly on knuckle.

Three blows of 1,640 pounds, falling 5 feet.

Three blows of 1,640 pounds, falling 10 feet.

The coupler will be considered as having failed to stand this test if it is broken before it has received all the blows above specified, or if any cracks appear more than 1 inch long, or open more than 1-16 inch, or when center punched line is distorted more than 1 inch, or when knuckle is found to have closed more than ¾ inch from its original position when pulled out against lock by hand, after receiving three blows at 5 feet, or if knuckle will not open and locking devices operate after test. Should the coupler before failing stand three blows at 5 feet and two blows at 10 feet, another complete coupler shall be provided and tested, as per clause governing retest.

Test 2.—Guard Arm Test of Coupler.—As a preliminary, pivot pin, knuckle and locking device having been removed, coupler is to be marked on bottom with a center punched line, parallel to axis of shank, and extending from coupling face or contour to back end of shank; a center punch mark must also be placed at tip of guard arm and on lug.

Coupler is then held rigidly in a vertical position in machine, with steel fillers and wedges (the latter sledged down tight and this sledging repeated after each blow), butt resting solidly on anvil and blocked to prevent lateral motion, edge of guard arm in line connecting centers of legs of machine. Blows to strike directly on guard arm.

Three blows of 1,640 pounds, falling 3 feet.

Four blows of 1,640 pounds, falling 5 feet.

A coupler will be considered as having failed to stand this test when it is broken before it has received all the blows above specified, or when any cracks appear more than 1 inch long, or open more than 1-16 inch, or when center punched line is distorted more than 1½ inches, or when distance between punch marks on botttom of head has widened more than ⅛ inch. Should the bar, before failing, stand three blows at 3 feet and two blows at 5 feet, another coupler shall be provided and tested, as per clause governing retest.

Test 3.—Jerk Test of Complete Coupler.—The couplers will be placed in yoke forgings of machine, and equalizer placed in position in closed knuckles. Blows to strike directly on equalizer, midway between the two couplers.

Three blows of 1,640 pounds, falling 5 feet.

Three blows of 1,640 pounds, falling 10 feet.

A coupler will be considered as having failed to stand this test if it is broken before it has received all the blows above specified, or if cracks appear more than 1 inch long, or open more than 1-16 inch, or if equalizer will not stay in place when struck, or if knuckle will not open and locking devices operate after test. Should either or both couplers fail to stand the prescribed test, but both stand three blows at 5 feet and two blows at 10 feet, another complete coupler, or pair of couplers, shall be provided and tested, as per clause governing retest.

Test 4.—Pulling Test of Complete Couplers.—Couplers to stand a steady pull of 120,000 pounds. A coupler will be considered as having failed to stand this test if it is broken before it has been pulled the prescribed number of pounds, or if any cracks appear more than 1 inch long, or open more than 1-16 inch, or if couplers pull past each other in machine, or if knuckle will not open and locking devices operate after test. Should either or both couplers fail to stand the prescribed test, but both stand 90,000 pounds, another complete coupler, or pair of couplers, shall be provided, as per clause governing retest.

In case of the failure of any part of the complete coupler under tests 1, 3 and 4, only such parts of the lot of couplers represented by the test coupler shall be condemned as correspond to the part which failed

under the test, but the balance of the parts may be submitted for future test.

COUPLERS, AUTOMATIC. For M. C. B. Rules for Interchange of Traffic with regard to couplers see, DRAWBAR AND ATTACHMENTS and INTERCHANGE OF TRAFFIC.

COUPLER, ELECTRIC. FIGS. 4871-72. A device attached to the end of a car including insulated metallic contacts for the connection of electric circuits between cars, generally used for connection of trail car lighting, heating or signal circuits to the motor car. See, CONTROL SYSTEM.

COUPLER GAGES. FIGS. 4350-51. Gages adopted by the M. C. B. Association in 1891 to preserve the contour line for couplers. These gages may be obtained from Pratt & Whitney Company, Hartford, Conn.

COUPLER JUMPER. FIGS. 4871-72. Two coupler plugs connected by an insulated flexible cable. See, CONTROL SYSTEM.

COUPLER LABEL. In 1900 these specifications and tests for couplers were modified by the provision that couplers should have the Master Car Builders' label, as shown in FIGS. 4707-10. See page 187, Proceedings 1900. Further modification by letter ballot in 1901.

COUPLER PLUG. FIGS. 4871-72. A movable coupler designed to engage and connect to coupler socket. See, CONTROL SYSTEM.

COUPLER SOCKET. FIGS. 4871-72. A fixed electric coupler. See, CONTROL SYSTEM.

COUPLET (of Springs). FIGS. 4148-9. Two ELLIPTIC SPRINGS, which see, placed side by side, to act as one spring. Three springs united in this way form a triplet, four a quadruplet, five a quintuplet, six a sextuplet.

COUPLING. "That which couples or connects, as a hook, chain or bar."—Webster. A coupling link was called simply a coupling. See, COUPLER. See,

BASIN COUPLING.
BELL CORD COUPLING.
BERTH CURTAIN ROD COUPLING.
BRAKE HOSE CLUTCH COUPLING.
BRAKE HOSE COUPLING.
CLUTCH COUPLING.
COUPLING LINK.
HEAD BOARD COUPLING.
HOSE COUPLING.
PIPE COUPLING.
REDUCING PIPE COUPLING.
SCREW COUPLING (English).
STEAM HOSE COUPLING.

COUPLING BAR. See, BRAKE LEVER COUPLING BAR.

COUPLING BAR PIN (Brake Gear). A pin for the BRAKE LEVER COUPLING BAR, which see.

COUPLING CASE. See, BRAKE HOSE COUPLING CASE.

COUPLING CHAIN, OR CHAIN COUPLING LINK. A three link chain used in coupling to DRAW HOOKS, which see.

COUPLING HOOK. FIG. 941. A bracket with a hook projecting, on which the hose coupling is hung when uncoupled.

COUPLING HOSE. More commonly brake hose.

COUPLING LINK. A wrought iron link or open bar by which freight cars are coupled together by coupling pins. Chain coupling links are used with draw hooks. In consequence of the danger to trainmen attending the use of coupling links, and legislation forbidding their use after January 1, 1898, automatic car couplers have almost entirely replaced them. See, CAR COUPLER.

2. (English.) A link forming part of a wagon coupling or draw chain. The open ended link connected to the draw hook or draw bar is the coupling shackle. The intermediate links are sometimes termed the short links, and the end link the long link. A single long link is often used instead of three short intermediate links.

COUPLING PIN. A short bar of iron with which a coupling link is connected to a drawbar.

COUPLING PIN CHAIN. A small chain attached to the car by a suitable eye to prevent the coupling pin from being lost.

COUPLING SCREW (English). A right and left handed screw used in a SCREW COUPLING, which see.

COUPLING SHACKLE (English). The end link of the coupling which is secured by a pin to the shank of the DRAW HOOK, which see.

COVER. See,

DRUM COVER.
JOURNAL BOX COVER.
MAN HOLE COVER.
MOLDING JOINT COVER.
URINAL COVER.
WINDOW MOLDING JOINT COVER.

COVER PLATE. A face plate of a steel tired wheel is a disk connecting the tire and hub.

COVER STRIP. 1. (Refrigerator Car.) Metal plates covering a gutter in the floor.

2. A strip of metal, or sometimes wood, to cover a joint in the roof sheets. 3, FIGS. 1714-26.

COVERED WAGON (English). A roofed vehicle used for conveying freight liable to be stolen or to be damaged by damp. It has side doors which can be locked, and occasionally doors in the roof so that the contents can be readily hoisted. As a rule, TARPAULINS, which see, and open cars are used in England.

CRABS, OR TONGS (Pile Driver Car). See, TONGS, also called rail clips, or rail clamps.

CRANE (Pile Driver Car). See, PILE DRIVER CAR and DERRICK.

CRANE POST. The post of a crane, which corresponds to the mast of a derrick.

CRANK. 1. "Literally a bend or turn; hence an iron axis with a part bent like an elbow, for producing a horizontal or perpendicular motion by means of a rotary motion or the contrary."—Webster. See, BELL CRANK. See also, BRAKE SHAFT CRANK. DOOR SHAFT CRANK (Street Cars).

2. (Of a Derrick or Crane.) The L-shaped handle by which the driving gear is actuated.

3. (Of a Lever Hand Car.) 6, FIGS. 4722-27. The BELL CRANK (which see) of a hand car; 23, is at the upper end of the connecting rod, the crank at the lower end.

CRANK SHAFT (Lever Hand Cars). 6, FIGS. 4722-27. A short wrought iron shaft to which a crank of a hand car is attached, which is turned by suitable levers and is connected by gear wheels with one of the axles of the car.

CRANK SHAFT BEARINGS (Hand Car). 5, FIGS. 4722-27.

CRIB RAIL (English). A longitudinal piece of timber secured to the upper part of the outer side of the sole bar and supporting the body of the vehicle.

CRICKET IRON. A SEAT STAND, which see.

CRIPPLE POST. (Street Cars.) A post of an end window, where the window is not of the full width, between the door post and corner post.

CROSS BAR (Swing Link Hanger). The bar supporting the cross bar casting which carries the springs plank. Also called mandrel pin and lower swing hanger pivot.

CROSS BAR CASTING, OR SPRING PLANK CARRIER (Swing Link Hanger). See, CROSS BAR.

CROSS BEAM. A transverse floor timber placed upon the sills to support the inclined floor of a coal or ore car.

CROSS BEARER (English). American equivalent, cross frame tie timber, needle beam, and sometimes cross bearer. A transverse member of the under frame, placed between the ends of the vehicle. It serves to transfer the weight of the body and lading to the sole bars, and keep the latter apart. Also called cross bar, or transom.

CROSS FRAME KING POST, OR TRUSS BLOCK. See, CROSS FRAME TRUSS.

CROSS FRAME TIE BOLT. A SILL TIE ROD, which see.

CROSS FRAME TIE TIMBER. 22, FIGS. 159-69, etc.; 26, FIGS. 360-72. A transverse timber bolted to the under side of the longitudinal sills and floor timbers of a car body between the bolsters, and to which the body king or queen posts, or truss blocks, are atttached when truss rods are used under a car body.

The term NEEDLE BEAM (which see), taken from

bridge engineering, is also used. Other names are body transom, cross bearer, cross berth, etc.

CROSS FRAME TRUSS. 26t, FIGS. 385-7 and FIGS. 436-38. A truss for a needle beam or cross frame tie timber. The various parts, king post, truss rod, truss rod washer, etc., are shown.

CROSS FRAME TRUSS ROD. See above.

CROSS HEAD (Westinghouse Brake). 6, FIG. 916. A forked casting attached to the outside end of a piston rod, to which the brake levers are connected.

CROSS TIE ROD (Street Car). A SILL TIE ROD, which see.

CROSS TIE TIMBER. 22, FIGS. 159-69, 185-95, 271-95 and 25, FIGS. 246-50; 26, FIGS. 360-72, 385-7, etc. A CROSS FRAME TIE TIMBER or NEEDLE BEAM, which see.

CROSS TIE TIMBER TRUSS ROD. 26c, FIGS. 360-72; 26t, FIGS. 385-7.

CROSS TIE TIMBER TRUSS ROD BEARING. See CROSS FRAME KING POST, etc.

CROSS TIE TIMBER TRUSS ROD QUEEN POST. 26b, FIGS. 360-72.

CROSS TIE TIMBER TRUSS ROD SEAT. A body truss rod bearing.

CROSS TIMBER HOPPER ENDS. A transverse floor timber framed between the intermediate sills, to which the lower end of the inclined floor is spiked and to which the outer hopper doors are hung. The ends of the draft timbers are bolted to it, and the short center sills abut against it.

CROWN LAMP SHADE. FIG. 2676. See, LAMP SHADE.

CROWN MOLDING (Street Cars). A molding on the inside above the deck sask and tacked to the deçk posts and carlines.

CROWN PIECE (Street Cars). A platform end timber or sill.

CROWN PIECE CORNER IRON (Street Cars). A strap iron that protects the corner of the crown piece.

CROWN RING (Pintsch Lamp). 314, FIGS. 2605-21.

CUFF RACK. FIG. 2789. For lavatories.

CUP. 1. "A small vessel used commonly to drink out of, but the name is also given to vessels of like shape used for other purposes."—Webster. See,

BUFFER SPRING CUP. OIL CUP.
CANDLE HOLDER CUP. SIDE BEARING CUP.
DRAIN CUP.

CUP HOLDER, OR TUMBLER HOLDER. FIGS. 2777-83. A stand or rack for holding a drinking cup.

CUP SIDE BEARING. A side bearing for trucks, with a receptacle for holding oil and waste. Little used.

CUP WASHER. A SOCKET WASHER, which see.

CUPBOARD BOLT. FIGS. 1902-07. See, DOOR BOLTS.

CUPBOARD CATCH, or FLUSH BOLT. FIGS. 1902-07. A very indefinite term for a light spring catch nearly or quite flush with the surface to which it is attached. It has a beveled bolt which snaps shut.

CUPBOARD LATCH. FIGS. 1902-05. See above.

CURLED HAIR. Hair from the tails or manes of cattle, horses, etc., which is first spun into ropes, then wound into coils, and either steeped or boiled in water. After this the coil is dried and the hair unwound, which leaves it in a curly and elastic state, suited for stuffing cushions, etc.

CURTAIN. 17, FIG. 1782. A cloth hanging in front of or around any space or object, as a window or sleeping car berth, and which may be contracted or spread at will. The term, however, is usually restricted to loosely hung drapery, suspended on a curtain rod by curtain hooks or rings, in distinction from a shade, which is flat and rolls up. Curtains in cars are chiefly used for sleeping car berths (BERTH CURTAINS, which see) and for the sides of OPEN STREET CARS, which see. Window curtains are used in dining, parlor and private cars. Except in the saloons, blinds have been abandoned, and window shades are in almost universal use on steam railroads. Blinds are still in general use in street cars.

CURTAIN (Buhoup Vestibule). 11, FIGS. 1526-1630.

CURTAIN BEARING (Buhoup Vestibule). 20, 20a and 21, FIGS. 1526-1630.

CURTAIN BRACKETS (Hartshorn and McKay). FIGS. 3725-28. One bracket has a circular hole and the other a rectangular.

CURTAIN FIXTURES. FIGS. 2826-87.

CURTAIN HOOKS (Sleeping Berths). FIGS. 3441-2.

CURTAIN PLATE (Buhoup Vestibule). 8 and 9, FIGS. 1526-1630.

CURTAIN RINGS. FIGS. 2845-48. Rarely used. See, CURTAIN.

CURTAIN ROD. FIG. 2854. A bar to carry a curtain hung upon rings and sliding freely along the rod.

CURTAIN ROD BRACKET. FIGS. 2826-57.

CURTAIN ROD BUSHING. FIGS. 2882-87. A socket or bushing for the end of a curtain rod as it abuts against a wall or partition.

CURTAIN ROD FOLDING BRACKET (Sleeping Car). 15, FIGS. 1778-83. A bracket for a curtain rod in a sleeping car which may be folded into the upper berth in such a manner that it is out of sight when the upper berth is shut up. See, FOLDING CURTAIN ROD BRACKET.

CURTAIN ROLLER (Buhoup Vestibule). 10, FIGS. 1526-1630.

CURTAIN ROLLER PLUG (Buhoup Vestibule). 45, FIGS. 1526-1630.

CURTAIN SPRING (Buhoup Vestibule). 44, FIGS. 1526-1630.

CURVED SEAT STOP. FIGS. 3301-05. See, SEAT STOP.

CUSHION. 1. FIGS. 3226-35. Cushions used in passenger car upholstery are of the box type, being built upon and connected with a wooden framework (cushion frame). See, SEAT CUSHION.

CUSHION BACK RAIL (English). In a carriage, a small transverse bar which confines the hind end of the seat cushion.

CUSHION FRAME. 12, FIGS. 3151-52, 3169-91. A wooden frame to which the seat springs and upholstery of a car seat are attached.

CUSPIDOR. FIG. 2176. A vessel to receive discharges of spittle, and having a wide rim so that if it is upset its contents will not be spilled. It is the substitute for a spittoon, FIG. 2173, from which it differs only in form.

CUT OUT. A switch or fuse in a branch electric circuit or loop, used to disconnect the branch circuit from the main circuit.

CUT OUT COCK. FIG. 943. See, BRAKE CUT OUT COCK.

CYLINDER. 1. A chamber or vessel whose ends are circular, and with straight parallel sides, as the cylinder of a steam engine. The cylinders used in connection with cars and locomotives are made of cast iron, and have pistons fitted so as to work air tight in them. Cylinders used in brake apparatus are shown in FIGS. 916-19, 975-77. Also see, AIR CYLINDER. BRAKE CYLINDER.

2. A name sometimes given to the fire pot of a stove or heater, as in FIG. 2201.

CYLINDER BODY (Westinghouse Brake). 2, FIGS. 916-19. The main central portion closed by the cylinder heads.

CYLINDER CAP (Triple Valve). 3, FIG. 913, and 19, FIG. 910.

CYLINDER CAP GASKET (Triple Valves). 23, FIG. 910; 11, FIG. 913.

CYLINDER HEAD. A metal cover for the end of a cylinder, held on by cylinder bolts or cylinder studs. The cylinder head through which the piston passes is commonly termed the back cylinder head, and the other the front cylinder head, corresponding to locomotive practice. In the Westinghouse air pump and engine they are designated as top and bottom cylinder heads. See, CYLINDER.

CYLINDER LEVERS (Westinghouse Brake). FIGS. 555-6. Two levers which are connected together by a tie rod attached near their centers. One end of one lever is attached to the cross head of the brake cylinder, and the corresponding end of the other is attached to a bracket on the brake cylinder head at the opposite end of the cylinder. The other ends of the levers are connected with the floating levers by rods.

CYLINDER LEVER BRACKET (Westinghouse Brake). A T-shaped piece of iron bolted to the front cylinder head, to which one of the brake levers is attached.

CYLINDER LEVER GUIDE. FIGS. 609-10.

CYLINDER LEVER SUPPORT (Westinghouse Brake). A wrought iron bar bolted to one of the center sills, on which the ends of the cylinder levers rest.

CYLINDRICAL GAGES. Gages made for measuring the size of cylinders and cylindrical holes, often called Whitworth gages. They consist of steel cylinders and rings hardened and ground very accurately to standard sizes. These fit into each other. The first is used for measuring the size of holes, and the last for measuring the outside of cylindrical objects, and they are called internal and external cylindrical gages. They are generally used as standards alone, from which other tools and gages are made of the proper size.

CYLINDRICAL STOVE. See, STOVE.

D

DAMPER. See, STOVE PIPE DAMPER. A valve for regulating the draft.

DAMPER HANDLE. See, STOVE PIPE DAMPER HANDLE.

DAMPER PLATE (Pintsch Lamp). 467, FIGS. 2605-21.

DASH GUARD (Street Cars). A plate attached to the platform railing to prevent mud or snow from being thrown upon the platform. Called a dash board and a dasher.

DASH GUARD STRAPS. Small clips by which a dash guard is fastened to the platform posts. Also called dasher post clip.

DASHER OR DASHBOARD. See below.

DASHER POST (Street Cars). A post supported by the crown piece which carries the dasher and the platform rail. Called on steam cars a platform railing post.

DASHER RAIL (Street Cars). A platform rail.

DASHER RAIL CAP (Street Cars). A wood or metal cap bolted to the dasher rail for decoration and to prevent injuries.

DAY COACH. FIGS. 69-76, 360-65. A common term for an ordinary passenger car in distinction from sleeping cars. It ought in strictness to include parlor cars, but in general does not. It is often termed a COACH simply, which see.

DAYTON DRAFT GEAR. FIGS. 1248-59.

DAYTON FREIGHT CAR DOOR LOCK. FIGS. 2091-92. See, DOOR HASP.

DEAD AIR SPACE (Insulation of Refrigerator Car). Air spaces which have no communication with the atmospheric air outside, so there can be no free circulation or change of air as there is in a free air space.

DEAD BLOCK. A single wooden block or stick of timber attached to the end sill of freight cars to protect persons between the cars from injury, by preventing the cars from coming together in case the drawbar or its attachments should give way. They are called dead blocks from the fact that they are blocks which subserve no function in the construction of the car proper. See, BUFFER BLOCK.

The M. C. B. standard dimensions recommended in 1882 were amended in Saratoga, 1884, as follows:

Buffer blocks are to be made 8 in. square on the face and 6 in. thick, and are to be placed 22 in. apart from center to center, and to have 14 in. space between them.

Single dead blocks are to be not less than 30 in. long, 7 in. thick, and 8 in. deep, measured vertically.

DEAD LEVER (of Brake Gear). 92A, FIGS. 3735-3951, etc. The one of a pair of levers to which the brake shaft connecting rod is not attached. The upper end of the dead lever is confined within a dead lever guide, or brake lever stop, which latter is provided with pins to adjust the end of the brake lever as the brake shoes wear. The lever to which the power is first applied is termed the live lever.

DEAD LEVER GUIDE. OR BRAKE LEVER STOP (Brake Gear). FIGS. 878-80; 95, FIGS. 3735-3951. See above.

DEAD LOCK. FIGS. 2089-90. A lock in which the bolt is thrown each way by the key, and not in one direction by a spring, as with a spring lock or night latch.

DEAD PADLOCK. A padlock in which neither the lock, bolt, nor hasp has a spring, but the former is thrown each way by the key, and the hasp must be opened by the hand.

DEAD WOOD. A DEAD BLOCK, which see.

DEADENING, OR DEAFENING. The filling placed between the floor and the deafening ceiling to serve as a non-conductor to heat and noise. MINERAL WOOL, which see, is sometimes used for deadening, but commonly shavings, when anything at all is used. An intermediate floor (between the sills) and deafening ceiling (under the sills) is used in refrigerator cars.

DEAFENING CEILING. 28, FIGS. 388-91. Boarding on the under side of the floor timbers of a passenger car to exclude or deaden the noise of the car. When cut and inserted between the sills it is called a deafening floor, but quite as often, though improperly, a deafening ceiling. See, DEADENING.

DEAFENING FLOOR. See, DEAFENING CEILING.

DECATUR GRAIN DOOR. FIGS. 1107-37. A door suspended from the carlines over head when not in use. The door posts are gained out and fitted with angle irons, behind or between which the door fits. A lever is provided by which the door may be started from the bottom and the grain allowed to discharge itself automatically.

DECK. 102, FIGS. 360-72, etc. A term applied to the roof of a passenger car by analogy from the deck of a ship. The term is not applied in general use, however, to freight cars. The deck of passenger cars is subdivided into the upper deck (also called CLEAR STORY, which see), and lower deck, the roof at the side of the clear story; but in designating parts which belong to the clear story alone, and which are not repeated in the lower deck, the term deck alone is used.

Since the issuing of the first edition of this work the use of the term deck instead of clear story in compound words seems to have become practically universal among manufacturers of furnishings and in far more general use than any other among car builders.

DECK BEAM. 1. A beam in the form of an inverted T with a round knob on the upper end, used in some forms of iron car construction. The Sterlingworth steel brake beam (FIGS. 842-51) is a deck beam.

2. Transverse beams extend across a car from side rail to side rail to which the deck planks are spiked.

DECK BOTTOM RAIL. 112, FIGS. 388-91. A horizontal timber running lengthwise of a car, fastened to the rafters and carlines of the main roof, or to the deck sill, which forms the base for the deck posts. The term is sometimes applied to the deck sill.

DECK BRIDGING. See, BRIDGING.

DECK CARLINE, OR UPPER DECK CARLINE. 118, FIGS. 360-72, etc. A timber which extends from side to side of the upper deck, and supports the roof boards. Corresponding parts in the lower deck are generally called rafters.

DECK COLLAR (Heaters). A sheet metal ring to line the smoke pipe opening through the roof, having a double sheet metal tube to leave an air space as a heat guard, and a flange on the outside to exclude rain.

DECK EAVES MOLDING, OR UPPER DECK EAVES MOLDING. 119, FIGS. 392-98. A molding under the outside edge of the upper deck.

DECK END PANEL. 116, FIGS. 388-91. It is frequently used as a ventilator.

DECK END PLATE. A member that fulfills the same office

for a clear story that the body end plate does for the body. See, END PLATE.

DECK END SILL. 230, FIGS. 385-87; 113, FIGS. 388-91. A horizontal timber connecting the ends of the deck sills, and forming the base for the end of the upper deck.

DECK END VENTILATOR. See, DECK END PANEL.

DECK END VENTILATOR HOOD (Street Cars). A projecting screen, placed over the aperture of an end ventilator, to exclude snow and rain. Also called upper deck hood.

DECK INSIDE CORNICE. 120, FIGS. 392-98. A molding which fills the interior angle where the upper deck joins the deck side.

DECK LAMP (Pintsch System). FIGS. 2577-82. A lamp which is fastened to the deck or ceiling of the car without any drop. An ornamental ring surrounds the rim of the bowl, which projects through the deck.

DECK PLANKING. Planking nailed to the side and end rails of a coal or ore car to form a deck.

DECK PLATE. 117, FIGS. 360-72, 385-87; 121, FIGS. 388-91. A horizontal timber on top of the deck posts or mullions to which the deck carlines are attached. Also called a deck top rail.

DECK POST. 115, FIGS. 360-72, 385-87, 388-91. An upright piece of wood which connects the deck plate with the bottom rail.

DECK SASH. 144, FIGS. 360-72, 388-91. A glazed sash in the sides of the upper deck.

DECK SASH CATCH. FIGS. 3535-41. A hook giving a simpler equivalent for a deck sash latch.

DECK SASH DOUBLE RATCHET. FIGS. 3571-72. A special form of deck sash pivot plate, used with spring ratchets.

DECK SASH FLUSH CATCH. A deck sash latch mortised into the sash rail flush with the sash.

DECK SASH LATCH. FIGS. 3535-41. A spring bolt attached to a deck sash, which engages with a deck sash latch keeper or strike plate. See, KEEPER.

DECK SASH LATCH KEEPER. FIGS. 3558-61. See above.

DECK SASH LINTEL. See, LINTEL.

DECK SASH OPENER. FIGS. 3504-15. A lever attached to a revolving rod by which a deck sash is held in any desired position. A great variety of forms exist, including many patented devices. See engravings. A pull hook, FIGS. 3546-50, is sometimes called a deck sash opener, but a more elaborate contrivance is generally meant.

DECK SASH, OUTER. 144a, FIGS. 392-98. A deck sash which carries the screen, and prevents the admission of dust and cinders.

DECK SASH PIVOT. FIGS. 3528-34. A metal stud or spindle attached to a suitable flange by which it is fastened to a deck sash, and on which the latter turns. A variety of forms exist, including several patented devices, as Monitor, FIGS. 3569-70; Morgan, FIGS. 3554-57, etc., to render the sash readily removable and adjustable.

DECK SASH PIVOT BUSHING. Same as FIGS. 3579-80. See, BUSHING.

DECK SASH PIVOT PLATE. FIGS. 3528, etc. A plate attached to the window casing, with a hole or eye in which a deck sash pivot works. Sometimes they are provided with springs to prevent the sash from rattling.

DECK SASH PULL. FIGS. 3516-22. A screw ring attached to a deck sash to open and close it. Made either with screw or with flange.

DECK SASH QUADRANT. FIGS. 3563, 3568. A curved bar or plate of metal used as a guide or stop to control the movement of a deck sash. Little used.

DECK SASH QUADRANT CLIP. FIG. 3563. A guide strap embracing a deck sash quadrant.

DECK SASH RATCHET PLATE. FIGS. 3569-72. A part usually attached to the side of the car, but sometimes to the sash, carrying a ratchet in which the ratchet catch engages.

DECK SASH SOCKET. FIG. 3566. A hook attached to a peculiar form of deck sash pivot. See engravings.

DECK SASH SPRING PIVOT. FIG. 3527. A DECK SASH PIVOT, which see, provided with a spring to make the sash removable.

DECK SCREEN BOTTOM RAIL. 112A, FIGS. 392-98. A rail running the entire length of the clear story, and closing the space between the bottom of the screen and the roof.

DECK SCREEN POST. 144p. FIGS. 388-91.

DECK SIDE. The entire part, consisting of a plate, rail, posts, and panels, or sashes, which forms the side which occupies the vertical space between the lower and upper deck.

DECK SIDE VENTILATOR. FIGS. 3504-15. This term is used to designate the sash or valves and their attachments for opening and closing the aperture.

DECK SILL. 111, FIGS. 360-72, 385-87, 388-91. A horizontal timber attached to the inner ends of the rafters, or short carlines, on which the deck side rests.

DECK SILL BOTTOM MOLDING. 114a, FIGS. 388-91.

DECK SILL FACING. 114, FIGS. 388-91. Thin boards or moldings attached to the inside of a deck sill, for ornament. Sometimes the bunk apron serves this purpose in sleeping cars. See 7, FIGS. 1778-83.

DECK SILL SUB-FACING. 114a, FIGS. 388-91.

DECK SOFFIT BOARD. 121S, FIGS. 388-91. A board on the under side of the overhanging cornice of an upper deck.

DECK TOP RAIL. 117, FIGS. 392-98. A DECK PLATE, which see.

DECK VENTILATOR. See, DECK END VENTILATOR. DECK SIDE VENTILATOR. The deck sashes are frequently hung and operatetd as deck side ventilators as by the continuous deck sash opener. FIG. 3523.

DECK WINDOW SCREEN. S, FIGS. 388-91 and 36, FIGS. 1778-83. An outside sash with a screen over it to exclude dust and cinders.

DEFLECTING PLATE (Pintsch Lamp). 346, FIGS. 2605-21.

DEFLECTING PLATE AND CHIMNEY (Pintsch Lamps). 288, 288a, FIGS. 2605-21.

DEFLECTOR. 1. (For Windows.) FIGS. 3695-98. A piece of thin board attached to the jamb of the window and left projecting two or three inches beyond and at right angles to the car. When the car is in motion it deflects the cinders and dust from the window, and also produces an exhaust draft. Also called a window dust guard.

DEFLECTOR SPRINGS (of Ventilators). Springs controlling the movement of the deflectors.

DEFLECTOR VENTILATOR. A name given to the Pancoast ventilators, FIGS. 3497-98.

DERRICK CAR. FIGS. 142-43. A strong platform car which carries a derrick crane which is used for removing wrecked cars and engines, erecting bridges, or handling any heavy objects. Also called wrecking car. They are distinguished as hand or steam derrick cars, according to the power used.

DESTINATION BOARD BRACKET (English). A small shelf of cast or wrought iron secured to the upper part of the outside of the body, in order to carry a wooden board or enameled metal plate, giving the destination of a train. It is universally used on all English carriages, and carried throughout the entire trip.

DETACHABLE GLOBE HOLDER. A globe holder arranged so that a lamp globe can readily be attached or removed. Many lamps have the globes fixed or plastered.

DETACHING SLOT (Deck Sash Ratchet). A slot in the ratchet plate to facilitate removal of the sash.

DETECTIVE WIRE (for Seals). FIG. 3137. A flat twisted wire or other equivalent device to prevent the seal being stripped from the wire without destroying one or both.

DIAGONAL (English). American equivalent (used chiefly in street cars), diagonal floor timber. A member of the under frame. One end butts against the rear side of the transverse end member of the under frame (the

head stock), and the other end butts against an intermediate transverse member of the under frame (the cross bearer) near its center. The diagonals take the strain of the side buffers, and distribute it so as to prevent distortion of the under frame. See, END SILL DIAGONAL BRACE.

DIAGONAL FLOOR TIMBERS. Floor timbers which are placed in an inclined position to the sills. Used chiefly on street cars.

DIAGONAL ROOF STRAP (Street Cars). A band of hoop iron placed diagonally on the top of the roof boards to stiffen the roof.

DIAL COCK (Consolidated Car Heating). FIG. 2310. A ¾ inch asbestos packed cock, the flange of which is made in the form of a dial to indicate the amount of opening of the cock. It indicates to the eye the exact position of the plug and the size of the opening for the admission of steam.

DIAMETER TESTING GAGE (for Car Wheels). A gage for testing wheels and axles. Sometime, an M. C. B. standard.

DIAMOND SPECIAL BRAKE BEAM. FIGS. 852-53. A trussed beam using a heavy rectangular bar for compression member and an iron rod for tension.

DIAMOND "S" FREIGHT SHOE. FIG. 1016.

DIAMOND "S" SKELETON BRAKE SHOE. FIG. 1007. A brake shoe with flange and skeleton body for locomotive driving wheels. Cast iron body and expanded metal inserts.

DIAMOND TRUCK. A car truck with iron side frames consisting of two or more ARCH BARS, which see, and a pedestal tie bar. The spaces between the arch bars are diamond shaped, whence the name. The journal boxes are rigidly bolted to the sides. The cross members of the truck, bolster, spring plank, etc., are either of wood or iron, or of both wood and iron combined. Iron transoms, bolsters and spring planks may be said to be in general use and increasing in favor.

At the Master Car Builders' Convention (1884) it was voted that this form should be the type used in preparing designs for a standard freight car truck, to have a 5 ft. wheel base, channel bar transoms, and either SWING or RIGID BOLSTER, which see. It is the type in almost universal use for freight cars, and the rigid bolster is applied to nearly all new construction. The swing bolster truck remains a standard on a few important roads that have a large traffic of live stock.

DIAPHRAGM. 1. (Eames Vacuum Brake.) An equivalent for the Westinghouse brake cylinder, serving to operate the brakes. It consists of a cast iron, bowl shaped shell, to which the diaphragm rubber is attached by diaphragm rings. A rubber diaphragm hose connects it to the brake pipe.

2. (Pintsch Gas Pressure Regulator.) FIG. 2473.

3. (Refrigerator Car.) See, CONDENSING DIAPHRAGM.

4. (Westinghouse Brake and Train Signal Apparatus.) Some valves are regulated by diaphragms or diaphragm plates, to which are attached springs, nuts, stems, etc., etc., whose names explain themselves. See FIGS. 947-50. These diaphragms all operate on the same principle. They are spring plates, which guide the rod and, assisted by spiral springs, cause the attached valves to seat or unseat at a fixed pressure.

5. (Of a Vestibule.) FIGS. 1799-1805; 2, FIGS. 1784-86. A piece of rubber, ducking or canvas in folds attached to the diaphragm face plate and platform inclosure to exclude the dust and cinders, and at the same time to allow the face plates free movement laterally and longitudinally in the Gould vestibules, and longitudinally only in the Pullman vestibules.

DIAPHRAGM BUTTON (Pump Governor). 12, FIGS. 963-64.

DIAPHRAGM FACE PLATE. 1, FIGS. 1784-86. See, FACE PLATE. DIAPHRAGM. VESTIBULES. PULLMAN VESTIBULES.

DIAPHRAGM RING (Pump Governor). 43, FIGS. 947-50.

DICTIONARY OF TERMS (Master Car Builders). At the Fifth Annual Convention, held in Richmond, Va., in 1872 (see page 18 of the report of that meeting), it was

"Resolved, That a committee, with power to publish an illustrated book defining the proper terms or names of each and every part used in the construction of railway cars, and a description of the use of the same."

At the Fourteenth Annual Convention, held in Detroit in 1880, "The committee to which was assigned the duty of preparing a dictionary of terms used in the construction of cars submitted a copy of the book and reported that it had finished its work, and it was discharged."

DINING CAR. FIGS. 82-87, 136-39, 368-72. A car provided with a kitchen and cooking appliances and arrangements for serving meals.

DINING CAR RANGE. FIGS. 2738-43. See, RANGE.

DIPPER (Steam Shovel). 1, FIGS. 357-59. Also called bucket or shovel.

DIPPER BAIL (Steam Shovel). 3, FIGS. 357-59. The link fastened to the top of the dipper and to the dipper block.

DIPPER BLOCK (Steam Shovel). 5, FIGS. 357-59. The block at the point of the boom around which passes the hoisting chain.

DIPPER TEETH (Steam Shovel). 2, FIGS. 357-59. Teeth projecting from the dipper to break the earth.

DIRECT STEAM HEATING SYSTEMS. FIGS. 2291-94. A system of car heating in which the steam from the locomotive or heat tender is carried directly to the radiators or heating pipes. The term is used to distinguish the system from those in which the steam is employed to heat the water which circulates in the radiators or heating pipes, usually in connection with the Baker heater. See, CONSOLIDATED, GOLD'S and SAFETY'S SYSTEMS OF CAR HEATING.

DIRECT STEAM STORAGE SYSTEM. FIG. 2326. A direct system of car heating, in which the radiating pipes are enlarged and inclose a smaller pipe or tube which is filled with salt water or other heat retaining substance, and which when heated continues to radiate heat after the steam is shut off. In the Gold terra cotta storage heater the radiating pipe contains a fluted cylinder of terra cotta of the same extreme diameter as the inside diameter of the radiating pipe. These storage heaters are shown in detail in FIG. 2352. See, GOLD'S CAR HEATING SYSTEMS.

DISCHARGE PIPE (Air Pump). Also called reservoir pipe. A pipe by which the compressed air is conveyed from the air pump to the main air reservoir.

DISCHARGE VALVE. 1. (Of Car Signal Valve.) The valve in the attachment called the car signal valve. The whole device is also sometimes so called.

2. (Of Air Pump.) 11-14, FIG. 965. The valve through which the air as compressed passes to the main reservoir. There are two—upper and lower. See also AUXILIARY DISCHARGE VALVE.

DISHED CAP VENTILATOR. FIG. 3487. See, VENTILATORS.

DISTANCE BETWEEN THE BACKS OF THE FLANGES OF CAR WHEELS. The standard distance between the backs of flanges of car wheels is 4 feet 5⅜ inches. See Proceedings 1883, pages 55, 118-120.

In 1885 it was decided by letter ballot that in fitting wheels on axles a variation of ⅛ inch each way from the standard distance of 4 feet 5⅜ inches between flanges would be allowed, making the maximum distance 4 feet 5½ inches, and the minimum distance 4 feet 5¼ inches. See Proceedings 1885, pages 111-119. Drawing revised in 1896.

DISTANCE BLOCK. A short, thick piece of wood placed between two or more objects to keep them apart, or to preserve an interval of space between them, as floor timber distance block, truck bolster distance block, etc.

DISTANCE PIECE. A metallic distance block. See, DRAWBAR DISTANCE PIECE.

DISTRIBUTING TABLE (Postal Car). A table upon which the mail bags are emptied of their contents, and from which they are distributed to the various boxes or pouches.

DISTRIBUTING TABLE HINGE. FIG. 1965.

DITCHING CAR. A car provided with derricks and scoops for excavating the ditches of cuts by the power of a locomotive.

DIVIDING ATTACHMENT (Eames Vacuum Brake). A device to regulate the application of the brakes to either the locomotive or train, or both.

DIVISION ARM (Twin Seats). The middle seat arm between the two seats.

DOG. 1. A general term in mechanics for all devices which bite or take hold of or give motion to other parts. See, RATCHET DOG.

2. (For Pawl of Winding Shaft.) A disk or button eccentrically pivoted in such a way as to hold the ratchet wheel pawl of a winding shaft in its place. The pawl itself of a ratchet gear is also sometimes termed the dog in other forms of ratchet gear where no dog to hold the pawl is necessary.

3. A BRAKE PAWL DOG, which see. A very similar part of that defined above.

DOME. A clear story or upper deck is sometimes erroneously called a dome. See also, TANK DOME.

DOME HEAD (Tank Car). 109, FIGS. 325-37. The top of the dome.

"DOME" LAMP SHADE. FIG. 2674. A LAMP SHADE (which see) of curved or ogee outline.

DOOR. FIGS. 1026-1141. A frame of boards for closing a doorway. See, DOOR FRAME for names of parts. See also,

ASH PIT DOOR.	GRATED DOOR.
DOUBLE DOOR.	LAMP CASE DOOR.
DOUBLE FIRE DOOR.	OVERHUNG DOOR.
DRAFT DOOR.	PLATFORM TRAP DOOR.
DUST HAND HOLE DOOR.	SLIDING DOOR.
FEED DOOR.	SMOKE BOX DOOR.
FIRE DOOR.	UNDERHUNG DOOR.
GRAIN DOOR.	VENTILATOR DOOR.

DOOR APRON (Street Cars). A sheet iron cover attached to a swinging door to inclose the step.

DOOR BOLT. FIGS. 1889-1907. A metal bar attached to a slide and fastened to a door so as to hold it shut from the inside. They are either round, or barrel, or square. A square neck door bolt is one with an angle or shoulder in it. Flush door bolts are gained in so as to be flush with the surface, FIGS. 1899-1901. A cupboard catch is a form of door bolt having a beveled latch and actuated by a spring; but bolts so formed are commonly termed LATCHES, which see.

DOOR BOLT KEEPER. 72, FIGS. 1067-69; FIG. 1922, etc. A catch attached to a door frame, in which the bolt engages.

DOOR BOTTOM RAIL. 5, FIGS. 1029-37. See, DOOR FRAME.

DOOR BOTTOM VENTILATOR RAIL (English). A strip of wood running horizontally and supporting a sliding ventilator.

DOOR BRACE (Freight Car Doors). 69, FIGS. 159-69. A diagonal piece of timber framed to stiffen the door.

DOOR BUTT. A BUTT HINGE, which see.

DOOR BUTTON. L, FIGS. 1087-1106. "A small piece of wood or metal swiveled by a screw through the middle, and used as a fastening for a door or gate."—Knight. They are often attached by a rivet or pin to a metal door button plate, which is fastened on with screws. Sometimes the button is an eccentric disk.

DOOR CAP (Freight Car Doors). 177, FIGS. 159-69. A horizontal board across the top of the door.

DOOR CASE. 1. The frame which incloses or surrounds the sides and top of a door. The separate parts are the DOOR JAMBS, or DOOR POSTS, DOOR SILL and DOOR LINTEL, which see.

2. A partition at the end of a street car which incloses a sliding door when open.

DOOR CASE INTERMEDIATE RAIL (Street Cars). A rail of a door case above the window.

DOOR CASE PANEL (Street Cars). A panel in a partition which incloses the sliding door. There are two—the top panel and seat panel.

DOOR CASE SASH (Street Cars). A window sash in the partition which incloses a sliding door. It opens on hinges and is placed opposite to another in the end of the car inside of the door.

DOOR CASE SASH BUTTON. See, DOOR BUTTON.

DOOR CASE SEAT PANEL. See, DOOR CASE PANEL.

DOOR CASE TOP PANEL. See, DOOR CASF PANEL. In some cases a mirror is used in place of a panel.

DOOR CASE TOP RAIL. A stick parallel with the DOOR LINTEL, which see.

DOOR CENTER GIRTH (Freight Car Doors). A horizontal board across the middle of the door. A middle door rail, except that it is not framed into the door, but simply nailed on.

DOOR CHAIN BOLT. FIG. 1941. A device which permits a door to be opened a short distance, yet not far enough to gain admission.

DOOR CHECK. (Yale-Blount.) FIG. 2148. A combined door spring and hydraulic check, which automatically controls the motion of a door. The check consists of a metallic piston moving in a metallic cylinder against a non-freezing liquid, its motion being controlled by a regulating valve which may be set to give any desired action to the door to prevent slamming and noise.

DOOR FENCE RAIL (English). A horizontal piece of wood forming, on the outside of the door, the bottom of the window aperture. It is reinforced with a band of brass or iron against which the window sash bears when it is closed.

English carriage windows drop down to open, like an omnibus or street car window.

DOOR FRAME. FIGS. 1026-31. The structure in which the panels of a door are fitted. It is composed, as is also a window sash, of the stiles, or upright pieces at the sides; the mullions, or central upright pieces; the bottom rail; the lock, or central rail, and the top rail. The DOOR CASE, which see, surrounds it. See, FIRE DOOR FRAME.

DOOR FRICTION ROLLER. FIGS. 2153-66. See, SLIDING DOOR FRICTION ROLLER. CAR DOOR HANGER.

DOOR FULCRUM (Grain Door). J, FIGS. 1087-1106.

DOOR GLASS FRAME STOP RAIL (English). In a carriage, a small horizontal piece of wood in the lower part of the door against which the window drops when opened. See, DOOR FENCE RAIL.

DOOR GUARDS (Baggage and Freight Car Sliding Doors). 23, FIGS. 1036-37. Strips of wood which inclose the space occupied by the door when open to keep the freight from interfering with its movement.

DOOR GUARD BAND (Street Cars). A metal band fastened crosswise on the middle door rail to protect the door from being chafed. Also called a sliding door strip.

DOOR GUARD ROD. FIGS. 3021-23. See, VESTIBULE DOOR ROD.

DOOR GUIDE BRACKET. FIGS. 539-41.

DOOR HANDLE (Freight Cars). 1. 78, FIGS. 159-69 and FIGS. 503-04. A U-shaped iron bar attached to the door, sometimes horizontally and sometimes vertically. A SLIDING DOOR HANDLE, which see, is for passenger cars.

2. (English.) Serves the purpose of an American door knob. An L-shaped brass bar attached to the outer end of a door spindle, and conveniently shaped to be grasped by the hand, so that the door can be opened by a person either inside or outside the carriage.

DOOR HANGER. 68, FIGS. 159-69; 21, FIGS. 1029-37 and FIGS. 2153-60. A hook shaped piece of metal by which a sliding door is suspended at its top, and which slides on an iron track at the top of the door. For freight cars they are usually made of wrought iron, but sometimes of cast iron, with friction rollers, or sheaves, on which the door rolls. They are also used in sleeping and drawing room cars, and are then generally made of brass and plated. The name of these more elaborate forms is commonly extended into CAR DOOR HANGER, which see. See also, ANTI-FRICTION CAR DOOR HANGER.

DOOR HASP. 73, FIGS. 159-69, 1067-69, and FIGS. 518-20 and 2094. A metal clasp attached to car doors, by which they are fastened to a staple on the body of the car. Used chiefly on freight car doors, secured with a pin or bolt. They are now made of malleable iron and the pin fixed so it cannot be lost. Padlocks are rarely used on freight cars.

DOOR HASP PIN (Seal Lock). FIG. 2096. A projecting lug on which a carefully shaped door hasp enters, and is secured in place by the clasp.

DOOR HASP STAPLE. FIGS. 477-8 and 2095.

DOOR HINGE. 1. See, HINGE.

2. (English.) Three brass hinges, upper, middle and lower, securing the door to the body. These hinges generally differ slightly to allow for the curvature or fall under of the door.

DOOR HOLDER. FIGS. 2134-45. A device for holding a door open or shut. They are also called door stops, as they are also intended to check momentum of the door when swung open violently. See, LAMP CASE DOOR HOLDER. SLIDING DOOR HOLDER.

DOOR HOLDER CATCH, OR DOOR HOLDER STOP. FIGS. 2134-45. A metal bracket attached to the floor (floor stop) or side (partition stop) of a car, with which a door holder engages, to hold a door open.

DOOR HOOK. 22, FIGS. 1036-37 and FIGS. 1912-13, 1996-97. A SLIDING DOOR HOLDER, which see.

DOOR JAMB. 1, FIGS. 1029-31. The side piece or post of a door case. Also called door post. Not to be confused with the stiles of the door itself.

DOOR KEEPER OR DOG (Grain Door). G, FIGS. 1087-1106.

DOOR KNOB. FIGS. 1983-87, etc. A ball attached to the end of the spindle of a door latch to take hold of in moving the latch or opening the door. The knob is often made in various peculiar forms, as T door knob, FIG. 1982.

DOOR LATCH. FIGS. 1914-34. An attachment to a door to hold it shut. See, LATCH. A door latch is often made in combination with a lock, having a separate bolt and key to secure or fasten the door from the outside, as in FIGS. 2073-88, etc.

DOOR LATCH ARBOR. A DOOR LATCH SPINDLE, which see.

DOOR LATCH BOLT. See, LATCH.

DOOR LATCH HOOK. FIGS. 1914-34. The part of a sliding door latch which engages with the keeper and holds the door shut.

DOOR LATCH KEEPER. FIGS. 1902-07, 1914-34. Also called STRIKE PLATE, which see.

DOOR LATCH ROSE, OR ESCUTCHEON. FIGS. 1983-87. A plate fastened to a door as a guard or bearing for the spindle. A rose is frequently called a rosette. See, ESCUTCHEON.

DOOR LATCH SPINDLE. B, FIGS. 1980-81. A small metal shaft to which the door handle or knob is attached, and by which the latch is turned.

DOOR LATCH SPRING. A spring which acts on the latch hook or bolt and causes it to engage with its keeper; usually made of a flat piece of cast steel.

DOOR LIGHT (English). In a carriage, the window in the door, which in English carriages is lowered to open it like an omnibus or street car window.

DOOR LIGHT BOTTOM SASH RAIL OR GLASS FRAME BOTTOM SASH RAIL (English). The bottom part of the door window framing.

DOOR LIGHT STILE, or GLASS FRAME STILE (English). The upright members of the window framing.

DOOR LINTEL. 99, FIGS. 360-72, 385-87, 388-91. The horizontal part of a door casing above the door. It is usually of wood, but in passenger cars it is sometimes made of a thin shell of cast iron. See, DOOR FRAME.

DOOR LOCK. FIGS. 1910-2090. See, LOCK. A LATCH, which see, is usually combined with a passenger car door lock.

DOOR LOCK BOLT. See, LOCK.

DOOR LOCK KEEPER, OR NOSING. See, KEEPER.

DOOR MULLION. 2, FIGS. 1026-31. A vertical bar of wood between the panels of a door. See, DOOR FRAME. DOOR WINDOW MULLION.

DOOR NAME PLATE. A metal plate on the inside of a passenger car door with the name of the builder inscribed on it. This is now more commonly painted on.

DOOR PANEL. 151, FIGS. 388-91; 10 and 11, FIGS. 1029-31. "A piece of board whose edges are inserted into the groove of a thicker surrounding frame of a door."—Webster. They are distinguished as lower, middle and upper. Any panel, but especially the lower, is sometimes cut up into two twin panels by a door mullion, as in FIGS. 1029-31.

DOOR PANEL BATTEN (English). American equivalent, furring. In a carriage, a piece which stiffens the door panel, which is pinned to it.

DOOR PILLAR, OR DOOR STILE (English). American equivalent, DOOR STILE, which see. The outer sides of the stiles are beveled in a peculiar manner, so as to shut tight, and the inner sides are grooved to allow the movement of the window.

DOOR PIN (Freight Car Doors). 74, FIGS. 159-69, 271-95. A pin used to fasten a hasp to a staple. Leaden seals are sometimes attached thereto.

DOOR PIN CHAIN. 75, FIGS. 159-69. A chain by which a door pin is attached to a car.

DOOR PLATE. FIGS. 2108-2033. A notice plate. See, DOOR NAME PLATE.

DOOR POST, OR DOOR JAMB. 44, FIGS. 159-69, 185-95; 62, FIGS. 360-72, 385-87, 388-91. A vertical post which forms the side of a doorway.

DOOR POST ANGLE IRON. A, FIGS. 1087-1106.

DOOR POST PLATE. FIG. 667. A metal plate laid over the door post to protect it from damage.

DOOR POST POCKET. 44, FIGS. 159-69, and FIGS. 454-6, 466-8. See, POCKET.

DOOR PULL. FIGS. 1937-38. A D-shaped handle attached to a door to take hold of in opening or closing it.

DOOR RAIL. FIGS. 1029-37. A horizontal member or bar of the framing of a door. The upper one, 4, is called the top rail; the lower one, 5, the bottom rail; 6, the middle or lock rail; 7, the parting rail.

DOOR RAIL BRACKET (Car Doors). A bracket to carry a top door rail, serving as a guide for the door. See, DOOR TRACK BRACKET.

DOOR ROLLER. FIGS. 2153-66. Also called a door sheave. The term door roller is applied to a flat tread wheel pivoted in a bracket and attached to the bottom of a door to roll upon a flat surface rather than a narrow track.

DOOR SASH. 12 and 13, FIGS. 1029-37. A wooden frame, containing one or more panes of glass, placed in a door. In some cases one of these sashes is made to slide, so that it can be opened for ventilation. They are distinguished as lower and upper door sash. The lower sash is commonly movable for ventilation and held open by a door sash lift or bolt entering into a door sash plate.

DOOR SASH BOLT. FIGS. 3631-39. A metal pin attached to a sliding door sash to hold it in any desired position.

DOOR SASH PLATE. FIGS. 3639-43. See above.

DOOR SHEAVE, OR SLIDING DOOR SHEAVE. FIGS. 525-6, 2153-66. A small wheel on which a sliding door rolls. It is

usually placed at the top of the door, and sometimes at the bottom also. It is carried in a door sheave holder. A grooved casting called a door shoe or door slide is sometimes used as a substitute on freight car doors, especially when the load does not rest upon the lower door track. See also, DOOR ROLLER.

DOOR SHEAVE TRANSOM (Street Cars). A long narrow panel which is hinged and with catch so that access may be had to the car door sheaves and track.

DOOR SHOE. 70, FIGS. 159-69, and N, FIGS. 1087-1106. See, DOOR SHEAVE.

DOOR SILL. 64, FIGS. 159-69, 343-52. A cross piece attached to the floor on the under side of a door opening. In car construction the term is usually applied to an iron plate used under passenger car, and occasionally freight car doors.

DOOR SILL PLATE (English). American equivalent, door sill or door sill plate. A roughened brass wearing piece placed in the doorway entrance.

DOOR SLIDE. See, DOOR SHEAVE.

DOOR SPINDLE. FIGS. 1983-85. The bar passing through the door which carries the door knobs.

DOOR SPRING. FIGS. 2146-48. An attachment to make doors self closing. Two of the great numbers of devices in use are shown. Double action spring hinges, FIGS. 1971-72, are in general use instead, for the few doors requiring them.

DOOR STILE. 150, FIGS. 360-72, 388-91; 8, FIGS. 1029-37. One of the two upright pieces on the outer edges of a DOOR FRAME, which see.

DOOR STOP. 1. A peg or block against which a passenger car door strikes when opened, often provided with a rubber cushion, especially for swinging doors. Door holders, which both stop the door and retain it, are often called door stops, as FIGS. 2134-45.

2. (Freight Car Sliding Doors.) 71, 72, FIGS. 159-69. Blocks or strips of wood or iron to restrain excessive motion. They are distinguished as closed door stop and open door stop.

DOOR THRESHOLD PLATE. FIGS. 668-9. A plate on the threshold of the door.

DOOR TRACK. 65, 66, FIGS. 159-69, etc. A metal bar or guide which supports a sliding door, and upon which it moves, or by which it is held in its place. They are either top door tracks or bottom door tracks. The former usually carry the weight of freight car doors, being hung thereon by door hangers. The lower track serves only as a guide for the door shoes.

DOOR TRACK BRACKET. 67, FIGS. 159-69. An iron or wooden block fastened to the side of a freight car, to which a door track is attached, or which holds a sliding door in its place. See also, DOOR RAIL BRACKET.

DOORWAY. The passage or opening formed by a door casing, which is closed by a door.

DOOR WEDGE (Security Car Door). FIGS. 570-71.

DOOR WEDGE AND CLASP. FIG. 3078. A postal car furnishing.

DOOR WEDGE GUIDE PLATE (Security Car Door). FIGS. 449-50.

DOOR WINDOW MULLION. A middle upright bar. See, DOOR FRAME.

DOPE. A mixture of waste, oil, and grease, for journal box packing, which is not fluid.

DOUBLE ACTING SPRING HINGE. FIGS. 1971-72. A device to permit a door to open either way and also to make it self-closing. They are from 2½ to 7 ins. in length of flange, 4 ins. being the most usual. They consist in their original form of a hinge on a hinge, the two opening in opposite directions. The "Utility" double acting hinge is much like an ordinary butt hinge, the tendency to restore the door to its normal position when opened in either direction being caused by a spring.

DOUBLE BOARD ROOF. FIG. 1737. See, CAR ROOF. The upper layer of grooved boards is sometimes laid with the grooves under, so as to form a kind of tube between the two layers.

DOUBLE BRACE POCKET. FIGS. 471-2. See, POCKET.

DOUBLE CHAIR. FIGS. 3189-91, etc. A twin car seat. Formerly two reclining chairs combined in pairs to save room. They were used three abreast, two on one side and one on the opposite side of the aisle.

DOUBLE CIRCUIT SYSTEM OF CAR HEATING (Consolidated). FIGS. 2288-90. One form of the MULTIPLE CIRCUIT SYSTEM, which see.

DOUBLE COIL JET SYSTEM (Gold's Car Heating System). FIG. 2327. A system of car heating which combines the drum or jacket features with the jet or commingler system of injecting steam into the hot water circulation. The steam is first sent through the inner or steam coil of the double coil in the Baker heater, and then through an annulus, F, into the circulating pipe. The jet is so directed as to aid the circulation in the pipes. It is claimed to be noiseless. A feature of the system is the carrying of the steam pipe to the full height of the circulating drum before it enters the coils of the heater.

DOUBLE COIL NEST SPRING. A SPIRAL SPRING, which see, with another inside of it.

DOUBLE DECK STOCK CAR. FIGS. 219-22. One with two floors, or stories, one above the other, for carrying sheep, hogs, etc. The intermediate floor is called the upper floor or double deck.

DOUBLE DOOR. 1. A door made in two parts. These are sometimes fastened together by hinges, so as to fold back on each other, FIG. 1032, and sometimes each part is hinged to one of the door posts. Sliding doors are also sometimes made in two parts.

2. (Fruit Car.) Doors in pairs, one inside the other, as in refrigerator cars, etc., are also called double doors.

DOUBLE ELLIPTIC SPRING. See, ELLIPTIC SPRING.

DOUBLE IRON BODY BOLSTER. FIGS. 811-13. A common form for passenger cars with six wheel trucks, composed of two parallel iron trusses connected by iron plates or bars. It is seldom applied to freight cars.

DOUBLE PIPE CLIP. FIG. 2259. An iron band made with two bends for holding two pipes (as heater pipes) in their place. See, CLIP.

DOUBLE PLATE WHEEL. FIGS. 4217-18. A cast iron car wheel, the rim and hub of which are united by two cast iron plates or disks. Wheels in which the double plates extend only part way between the hub and rim, the connection being made by a single plate, are often called double plate wheels. See, CAR WHEEL, WHEEL, WASHBURN WHEEL.

DOUBLE RATCHET (Morgan's Deck Sash Pivot). FIGS. 3554-57. A pair of radially ribbed disks which engage with each other in any position, there being no separate dog or ratchet bolt.

DOUBLE SASH SPRING. See, SASH SPRING.

DOUBLE STRAP HANGER (Bell Cord). See, BELL CORD HANGER.

DOUBLE TRACK SNOW PLOW. FIG. 147. A push plow which plows the snow to one side of a track only, so as to not crowd it upon the other parallel track.

DOUBLE WASHER. A washer that answers for two bolts. See, TWIN WASHER.

DOUBLE WINDOW BLIND. The usual form of window blind. They are made in two parts, so as to require less height when raised. See, WINDOW BLIND.

DOUBLE WINDOW BLIND LIFT. FIGS. 3613-20, etc. See, WINDOW BLIND LIFT.

DOVE TAIL. "A flaring tenon adapted to fit into a mortice having receding sides so as to prevent the withdrawal of the tenon in the directions to which it will be exposed to strain."—Knight. There are many forms of dove tail joints.

DRAFT BAR SLIDE OR DRAWBAR SLIDE. (Street Cars.) A drawbar sector which supports the coupler end of the drawbar and over which it swings.

DRAFT BEAM. FIGS. 440-45, 1260-62. Gould malleable iron draft beam. A substitute for draft timbers and stops, being cast in one piece and bolted on the inside of the center sills. See, DRAWBAR SIDE CASTING.

DRAFT BOLT (Janney Coupler). 648, FIGS. 1526-1613. A draft spring bolt.

DRAFT DOOR (Baker Heater). FIGS. 2183, etc. A door in the smoke flue base, automatically opened and closed by the fire regulator, and by which the fire is regulated.

DRAFT GEAR. FIGS. 1142-1710. A term used to designate the drawbars, draft timbers, buffing apparatus, and all their attachments—in short, the whole of the arrangements by which a car is drawn and which resists concussions. See the various heads above. Also, DRAWBAR, DRAW HEAD, DRAFT TIMBERS, etc.

DRAFT GEAR CHECK CASTING. A casting which incloses the thimbles or followers and carries the thrust to the draft sills and draft timbers, with which they engage.

DRAFT GEAR TIE ROD. A rod which connects an end sill or platform end timber with a body bolster or drawbar cross timber to tie them together. The term is sometimes applied to the continuous draft rods that run from one drawbar to the one at the other end of the car.

DRAFT REGULATOR. See, FIRE REGULATOR.

DRAFT ROD (Continuous Draw Gear). A rod which unites two drawbars at opposite ends of a car, and relieves the draw timber attachments from strain.

DRAFT SILLS. The CENTER SILLS, which see.

DRAFT SPRING. 1. 24, FIGS. 159-69 and FIG. 4550. A spring attached to a COUPLER or DRAWBAR, which see, to give elasticity. They are usually so arranged by means of follower plates at each end as to resist either tension or compression. The usual size for draft springs is 5½ inches in diameter and from 6 to 8 inches in length, double coil spiral springs.

In 1893 a Recommended Practice was adopted by the M. C. B. Association for attaching M. C. B. automatic couplers to cars, as shown in FIGS. 4490-4506, and by a separate vote the use of a draft spring 6¼ inches diameter by 8 inches long, with 2½ inches motion and 22,000 pounds capacity, was recommended.

2. (English.) A long, half elliptic spring reaching entirely across the car. Rubber draft springs are more generally used, especially with continuous drawbars. Sometimes called a draw spring.

DRAFT SPRING CRADLE PLATE (English). A longitudinal plate in the under frame, which supports the draw spring.

DRAFT SPRING POCKET. A DRAWBAR SPRING POCKET, which see.

DRAFT SPRING STOP. A metal sleeve or thimble in the center of a spiral draw spring to resist excessive compression. Not to be confused with a DRAWBAR STOP, which see.

DRAFT SPRING THIMBLE. FIGS. 491-92. A projection riveted to the follower plates and fitting inside the draft spring to hold it in place.

DRAFT TIMBERS. 26, FIGS. 159-69, 185-95, 271-95, etc.; 31, FIGS. 360-72. A pair of timbers, carrying the drawbar attachments, placed below the center sills, and usually extending from the platform end timber of passenger cars, or the end sill of freight cars, to the body bolster. In passenger cars these timbers are usually the principal supports of the platform. See, PLATFORM SILLS and PLATFORM SHORT SILLS. The draw timber in a tip car is also termed a car perch.

DRAFT TIMBER POCKET. A casting attached to the body bolster or center sills of a car to receive the end of a draft timber.

DRAFT TIMBER TIE BAR. A transverse iron bar attached to the under sides of a pair of draft timbers to tie them together.

DRAIN COCK (Air Pump). 54, FIG. 965; 105, FIGS. 893-94. A faucet attached to the lower end of the steam cylinder to draw off water of condensation. See also, RESERVOIR DRAIN COCK and TENDER DRAIN CUP COCK.

DRAIN CUP, OR DRIP CUP (Air Brake). A globular receptacle under a triple valve to collect water of condensation.

DRAIN PLUG (Brake Cylinder). 11, FIGS. 918-19. (Triple Valve.) 28, FIGS. 959-62; 13, FIG. 966.

DRAKE & WEIR CAR ROOF. FIG. 1775. See, CAR ROOFS.

DRAPERY CURTAINS. C, FIG. 1781.

DRAWBAR. 1. (Link and Pin.) An open mouthed bar at the end of a car, in which the coupling links enter and are secured by a coupling pin. They are provided with a DRAFT SPRING, which see, to give elasticity to the connection between the cars. Drawbars are made either of cast, malleable, wrought iron, or cast steel, and in respect to their form are either (1) bolt or spindle drawbars, in which the draw spring is attached by a bolt passing through its center; or (2) spring pocket or strap drawbars, in which the draw spring is inclosed within a yoke surrounding it. The solid head is a wrought iron drawbar forged in one piece instead of having a drawbar face plate riveted on. The drawbar is frequently called draw head, especially cast iron drawbars. With certain coal cars a cheap form of drawbar, called a draw hook, is used. In England this style is almost universal, in combination with plain links, in freight car service, and with a SCREW COUPLING, which see, for passenger cars. The drawbar of the Miller couplers is also very frequently called a coupling hook. See below.

2. The word drawbar is used indiscriminately to designate both the old link and pin drawbar and the modern automatic car coupler. There has been an effort to confine the name drawbar to the old link and pin type, but in the proceedings of the M. C. B. Association, in speaking of the height of drawbars, the term is manifestly applied to the M. C. B. standard automatic coupler. The general adoption of the word to mean the old link and pin drawbar is hardly desirable, if it were possible, for the link and pin drawbar is a thing of the past. The standard height of passenger car drawbars adopted in 1890 by the M. C. B. Association is 35 inches from the top of the rail to center of drawbar, where the car is light. The standard height of drawbar for freight cars from level of top of rails to center of drawbar is 34½ inches, adopted in 1893, with no greater variation than 3 inches, minimum height 31½ inches. See, AUTOMATIC CAR COUPLER. COUPLER and CAR COUPLER.

DRAWBARS, ADJUSTING HEIGHT OF. (M. C. B. Standard.) In 1896 it was decided that in adjusting the height of couplers to meet the requirements of the United States law fixing the height from the top of rail to center of coupler for standard gage cars in interstate traffic, cars should be adjusted when empty, as far as possible. In order to justify a bill for work done under the Rules of Interchange an empty car should be adjusted to 34½ inches, or within ¼ inch thereof, and when it is necessary to alter a loaded car it should be adjusted to 33½ inches, or within ¼ inch thereof, or as near as possible to such height as will bring it to 34½ inches when the car is unloaded.

In 1901 this was changed from Recommended Practice to Standard, as a result of letter ballot.

DRAWBAR ATTACHMENTS. FIGS. 4490-4506. In 1893 a Recommended Practice was adopted for attaching M. C. B. automatic couplers to cars, as shown, and by a separate vote the use of a draft spring, 6¼ inches diameter, 8 inches long, with 2⅛ inches motion, was recommended. At that time the capacity of the spring was placed at 22,000 pounds, but this was changed in 1896 to 19,000 pounds to better accord with the facts. See Proceedings 1893 and 1896.

In 1897 the yoke or pocket strap shown in detail in

FIGS. 4355-7 was adopted as standard of the Association, with the addition of ¼ inch radius at back end. This radius was changed to ⅝ inch in 1899.

In 1897 the buffer block and location shown in FIGS. 4363-65, but with some additional details of buffer block, were adopted as standard of the Association.

DRAWBAR BOLT. A bolt or spindle which connects a drawbar to a draw spring and follower plates, passing through the center of the latter. A tail bolt. See, DRAWBAR.

DRAWBAR CARRY IRON. 25 and 201, FIGS. 159-69 and FIGS. 607-8. A transverse iron bar bolted to the under side of the draft timbers, and on which the drawbar rests. It is usually U-shaped, and the ends are bolted to the end sills, but sometimes flat, with draft timber guards at the side, FIGS. 607-8. A drawbar carry iron is sometimes called a stirrup.

DRAWBAR FOLLOWER PLATES. FIGS. 594-6. Two iron plates which bear against each end of a draw spring and transmit the tension and compression on the drawbar to the draft springs and to the draft timbers.

DRAWBAR FOLLOWER STOP. FIGS. 479-81. A casting bolted or riveted to the sills or draft timbers to act as a stop to the motion of the follower.

DRAWBAR FRICTION PLATE (Street Cars). A cast iron plate through which the drawbar passes, attached to the platform end timber, to protect it from abrasion.

DRAWBAR GUIDE. Cast iron lugs, or wrought plates, bearing against the sides of draft timbers over the drawbar carry iron, to resist lateral strains and protect the draft timbers from wear.

DRAWBAR GUIDES. Wrought iron bars which are fastened in pairs to the top and bottom of the lugs or stops bolted to the draft timbers on each side, forming guides in which the drawbar follower plates move. A DRAWBAR JAW, which see, is sometimes used as a substitute for both the guides and stops.

DRAWBAR POCKET. A DRAWBAR SPRING POCKET, which see.

DRAWBAR POCKET GUIDE. FIGS. 534-6.

DRAWBAR SAFETY LUG. A horn on the upper side of a drawbar to bear against the end sill on a single dead block on the end sill, to relieve the draft spring, etc., from excessive buffing strain.

DRAWBAR SECTOR (Center Draft Draw Gear). A guide for the drawbar, shaped like an arc of a circle, fastened underneath the platform.

DRAWBAR SIDE CASTING. An iron casting, of which a pair serve as combined DRAWBAR GUIDE and STOP, which see, for the followers to hold them in their places. A drawbar jaw is a wrought iron substitute and equivalent.

DRAWBAR SPINDLE, OR STEM. The drawbar bolt which passes through the center of the draw spring and follower plates in a bolt or spindle drawbar.

DRAWBAR SPRING POCKET. The space at the back end of a spring pocket or strap drawbar which receives the draft spring and follower plates.

DRAWBAR STEM. A DRAWBAR BOLT, or TAIL BOLT, which see.

DRAWBAR STIRRUP. A DRAWBAR CARRY IRON, which see.

DRAWBAR STOP. A casting which limits the movement of the drawbar followers, bolted to the draft timbers and forming distance pieces, to which the drawbar guides are bolted. The castings for the drawbar stop are sometimes made long enough to bear against the body bolster, or a filling block interposed between it and the drawbar, thus relieving lugs and bolts of strain.

DRAWBAR YOKE. FIGS. 602-3. The yoke or strap pocket that incloses the draft spring and is bolted to the end of the drawbar is called a yoke.

DRAW CHAIN (English). See, WAGON COUPLING.

DRAW HEAD. The head of an M. C. B. coupler, exclusive of the knuckle, knuckle pin and lock. See also, DRAWBAR HEAD.

DRAW OFF COCK (Baker Heater). FIG. 2262. A cock attached to the pipe, R, for emptying the pipes. It is a COMBINATION COCK, which see.

DRAW SPRING. See, DRAFT SPRING.

DRAW TIMBERS. See, DRAFT TIMBERS.

DRAWER PULL. A wooden or metal attachment to a drawer to take hold of in pulling it out. In postal cars they are combined with label holders, FIGS. 3086-87.

DRAWING ROOM. A compartment in a drawing room car. See, STATE ROOM.

DRAWING ROOM CAR. A luxurious passenger car for day travel, furnished with arm chairs, sofas, carpets, etc. An extra charge is usually made to passengers who travel in them, and they are run by separate companies, like sleeping cars, under contract with the railroads. Also, and perhaps more commonly, termed PARLOR CAR, or CHAIR CAR, which see. Sometimes, extravagantly, palace car.

DRESSING ROOM. Another name for a saloon, especially one provided with wash bowl and toilet facilities. The ladies' saloon of sleeping and parlor cars is commonly so fitted.

DRILLING. A term used for SWITCHING, which see, or making up trains. Regulating is another term sometimes used. The English term for this is marshaling or shunting.

DRIP COCK (Air Brake). The cock at the bottom of the DRIP CUP, which see.

DRIP COUPLING, OR BASIN COUPLING (Wash Basin). FIG. 2754. The connection of the waste pipe or drip pipe with the basin.

DRIP CUP. (Air Brake.). FIG. 980. A receptacle inserted in the brake pipe of each car to receive water condensing therein. A drain cup.

DRIP DISH (Refrigerator Car). A dish or pan at one corner or end of the car for receiving the water from the melting ice, usually permitting it to escape by a TRAP, which see.

DRIP TRAY. FIGS. 3104-05. An enameled piece of sheet iron placed directly under the seat of a closet, and over the bowl.

DRIVING CHAIN (Pile Driver Car). A PITCH CHAIN, which see, used to make the pile driver car self propelling, by engaging with the pitch gear attached to one of the axles. Such cars are not usually made self propelling.

DRIVING GEAR (Lever Hand Car). 4, 5, FIGS. 4722-27. It consists of the spur wheel, or gear wheel, and pinion.

DROP (of Lamp). "The drop of a center lamp is its extreme length," measured from the ceiling to the lowest part of the lamp.

DROP BOTTOM. See, DROP DOOR.

DROP BOTTOM CAR. FIGS. 239-43, 259-65, 268-70. A car so constructed that its contents can be readily unloaded from the bottom by means of drop doors.

A distinction is sometimes made between hopper bottom cars, which will discharge nearly all their contents without assistance, on opening the drop doors, and a drop bottom car, which will not do this.

Drop bottom cars are usually gondola cars.

DROP DOOR. 61, FIGS. 246-50, 271-95. A door at the bottom of a drop bottom or hopper bottom car for unloading it quickly by allowing the load to fall through. Drop doors are usually, if not invariably, in pairs, and are supported by a drop door chain wound upon a winding shaft. A drop door beam extends across the car above the winding shaft to assist in supporting it and to stiffen the car. The subject of drop doors has received a great deal of attention of inventors, and numerous designs and devices have been patented, yet the original drop door with winding shaft and chain is in very general use.

DROP DOOR BEAM. See above.

DROP DOOR CHAIN. 64, FIGS. 271-95. A chain attached to

the WINDING SHAFT and the DROP DOORS, which see. Also termed hopper chain.

DROP DOOR HINGE. 62, FIGS. 271-95. See above.

DROP FORGING. One made under the drop hammer by the use of a die.

DROP LETTER BOX PLATE. FIGS. 3065-6. A LETTER DROP, which see.

DROP TABLE (Dining Car Kitchens). A table hinged to the wall so as to drop against it out of the way when desired.

DROP TEST MACHINE. (M. C. B. Recommended Practice). FIGS. 4711-13. In 1900 the drop testing machine was modified, and a further modification made in 1901. For details see illustrations in report of committee, pages 147-154, Proceedings 1901.

DRUM. 1. "A cylinder over which a belt or band passes.

2. "A chamber of a cylindrical form used in heaters, stoves and flues. It is hollow and thin, and generally forms a mere casing, but in some cases, as steam drums, is adapted to stand considerable pressure."—Knight. See, BRAKE SHAFT DRUM. CIRCULATING DRUM, or EXPANSION DRUM (Baker Heater).

3. (Hoisting Gear.) The main cylinder upon which the hoisting rope is rolled up. The spur wheel is carried on the same shaft.

DRUM COVER. 1. (Baker Heater.) FIG. 2263. A sheet iron covering for the circulating drum on the outside of the car.

DRUM SHAFT (of a Derrick or Crane). The shaft on which the winding drum is carried.

DRUM SUPPORT (Baker Heater). A bracket on the roof to hold the circulating drum.

DRUM SYSTEMS OF CAR HEATING. This method of heating employs a hot water circulation within the car, to which a Baker or other similar heater is attached. To provide a means for maintaining heat in the car when steam from the locomotive is used, a drum is employed to transfer the heat of the steam to the water of circulation. Simple forms of drums consist simply of a cylinder or pipe within another pipe of larger cross section, provision being made for the unequal expansion of the pipes, and outlet and inlet orifices being provided for the circulation of the steam and water.

Another type is the coil drum or coil jacket, which generally consists of a large sized pipe or casting capped at both ends. In this drum is placed a coil of copper pipe, which coil is made a part of the hot water circuit within the car. Steam from the locomotive is admitted to this drum around the copper coil, through which heat is imparted to the water of circulation. That part of the circuit above this drum becoming relatively lighter than the water of the circuit, a movement of the circulating medium is produced, creating a steady flow up through the coil. The amount of heat communicated to the circulating medium depends upon the surface of the coil and upon its conductive power to heat. A pressure of from 10 to 20 pounds of steam is carried in the drum.

DRY CLOSET. FIGS. 3115-19. A closet so called in distinction from a water closet, which is not flushed with water.

DUCK. A flax fabric, lighter and finer than canvas, for use in car upholstery. It is usually manufactured in rolls 18, 24 and 40 inches wide and about 40 yards long. Roofing duck (used for street car roofs) is manufactured of many different widths up to 12 feet, so as to entirely cover the roof when desired.

DUDGEON'S HYDRAULIC JACK. FIGS. 2985-86. See, JACKS. A jack with a base and head and two cylinders, one cylinder sliding within another. To the inner one (which is termed the ram) is attached the head, having a socket to receive the lever which operates the force pump in the lower end of ram; the remaining space is the reservoir containing the liquid, which when forced into the lower chamber causes the ram to rise, and to lower when allowed to return through the lower valve and back passages, which are operated by the same lever.

DUMMY COUPLING. FIG. 941. A casting of the same shape as a hose coupling, attached to the car, into which the coupling may be hooked and prevent dirt and debris getting in the train pipe, as well as to prevent the coupling being damaged when hanging down.

DUMP CAR. A term used to designate both DROP BOTTOM, SIDE DUMP and TIP CARS, which see.

DUNHAM STORM PROOF CAR DOOR. FIGS. 1042-49.

DUPLEX AIR GAGE (Air Brake). FIG. 921. A gage to register simultaneously on the same dial the main reservoir pressure and train line pressure. For this purpose a red hand for the reservoir and black hand for train line are provided.

DUPLEX AIR PUMP (New York Air Brake). FIG. 965. A pump for compressing air for the brake system, in which two air and two steam cylinders are used, and the air is compressed in two stages to the main reservoir pressure. In construction similar to the single air pump. See, AIR PUMP.

DUPLEX PUMP GOVERNOR (Air Brake). FIGS. 949-50, 963-64. Used in connection with the high speed brake. One diaphragm is set for 90 lbs. and the other for 110 lbs., and by turning the cut out cock the apparatus is readily changed from control at the low pressure to control at the high pressure.

DUPLEX VENTILATOR. FIG. 3489. See, VENTILATORS.

DUPLICATE ELLIPTIC SPRING. A DOUBLE ELLIPTIC SPRING, which see.

DUST ARRESTER (of Pintsch Gas Pressure Regulator). A cavity closed at each end by a perforated plate to prevent dust entering to clog the regulating valve.

DUST COLLAR. A grooved wrought iron ring, sometimes but not generally placed on a car axle between the hub of the wheel and the journal to receive and hold a dust guard.

DUSTER. See, FEATHER DUSTER.

DUST GUARD. 115, FIGS. 3781-3951; FIGS. 4084-90. A thin piece of wood, leather, felt or vulcanized fiber inserted in the dust guard chamber at the back of a journal box, and fitting closely around the dust guard bearing of the axle. It is to exclude dust and prevent the escape of oil and waste. Sometimes called axle packing or box packing.

DUST GUARD BEARING (Axle). See above.

DUST GUARD CHAMBER (Journal Box). See above.

DUST GUARD SPRING HOLDER. FIG. 3704. See, WINDOW DUST GUARD or DEFLECTOR.

DUTCHMAN. A block or wedge of wood driven into a crevice to hide the consequences of bad fitting in construction. A kind of shim.

DYNAMO (Gould Electric Light). FIGS. 2637-40. The machine for generating an electric current, driven by a belt from the car axle.

E

EAMES VACUUM BRAKE. A system of continuous brakes, operated by exhausting the air by an EJECTOR, which see, from behind flexible india rubber diaphragms attached to each truck. These diaphragms are directly connected to the brake levers, and the pressure of the air on the outside of the diaphragms is thus communicated to the brake shoes. The rubber diaphragms cover the mouth of a large cast iron diaphragm shell or bowl. Now little used.

EAR. A general name for projections to which handles or other exterior parts are attached, but more especially applicable to projections intended for movable attachments, See, EAR BAIL, below.

EAR BAIL (Lanterns). FIGS. 2730-37. An attachment formed of wire connected with the wire guard, to which

the bail is attached instead of to the body of the lantern.

EARTHEN HOPPERS. FIGS. 3092, 3093, 3095.

EASTMAN HEATER CAR. See, HEATER CAR.

EAVES FASCIA BOARD. 1. (Freight Cars.) 91, FIGS. 159-69. A plain board connecting the sheathing with the roof. 2. (Passenger Cars.) 92, FIGS. 360-72, 388-91. A projecting board on the outside of the lower deck, immediately under the eaves, which comes below and under the eaves molding.

EAVES MOLDING. 1. (Freight Cars.) A plain strip sometimes used outside an EAVES FASCIA BOARD, which see. 2. (Passenger Cars.) 93, FIGS. 360-72, 385-87, 388-91, etc. An ornamental finish to the exterior angle of the lower deck, outside of and above the eaves fascia board. A similar deck eaves molding is used for the upper deck.

ECCENTRIC PIVOT PLATE (for Seat Arms). A seat arm pivot plate, made eccentric only to get room for screw holes. The eccentricity has no functional purpose.

EDWARD'S AUTOMATIC WINDOW SASH BALANCE. FIGS. 3691-94.

EDWARD'S VESTIBULE TRAP DOOR. FIGS. 1795-98. A trap door mechanism for wide vestibules by which the door is forced up when the catch is released by a spring in the hinge. The catch is operated by a foot latch extending up into the vestibule. By pressing down on the latch the catch is released, and further pressure forces the door up out of the frame in case it sticks and the spring will not operate it.

EGG SHAPED STOVE. A stove resembling an egg in form. It is commonly known simply as a cast iron stove, and is very largely used for cabooses, etc., where appearance is not important.

EIGHT WHEEL CAR. The standard type of American rolling stock, consisting of a car body carried upon two TRUCKS or CAR TRUCKS (both of which see) of four wheels each. Sleeping, parlor, and dining cars are usually twelve wheeled.

EJECTOR. An appliance for operating a vacuum brake by exhausting or "ejecting" air. It consists essentially of a pipe placed in the center of a surrounding shell or casing, with an annular opening, between the pipe and the casing. When the current of steam is admitted at the lower end and escapes at the upper end, the air in the casing is drawn out through the annular opening by the current of the escaping steam. The space is connected by a pipe with the appliances on the cars for operating the brakes. Suitable valves are also used in connection with the ejector to shut off and admit steam and air. Ejectors are very noisy. In the ejector for Eames vacuum brake, a muffler is used to render noiseless the escaping steam. It consists simply of a box of small round balls, like shot, through which the steam must pass to escape.

EJECTOR SPIDER (Pintsch Lamp). 468, FIGS. 2605-21.

ELASTIC FIBER JOURNAL PACKING. A compound, principally of cocoanut fiber mixed with jute, to serve as a substitute for waste. It is lighter, cheaper, and claimed to be more effective.

ELASTIC WHEEL. Any car wheel in which some elastic material is interposed between the tire and the wheel center or hub to resist the concussions. Different substances are used, such as paper, wood, india rubber, oakum, etc.

ELBOW. FIGS. 2277, 2286, etc. A short L-shaped cast iron tube for uniting the ends of two pipes, generally at right angles to each other.

ELBOW RAIL (English). In a carriage, a part of the body framing running horizontally along the sides at about the height of the elbow of a passenger in a sitting position.

ELBOW REST (English). See, FOLDING ARM REST. SIDE ARM REST.

ELECTRIC CAR. An electric motor car.

ELECTRIC CAR HEATING APPARATUS (Consolidated and Gold's). FIGS. 2447-65. Both of these systems take current from the motor circuit and pass it through resistance coils placed under the seats or alongside the car. These coils or heaters are shown in FIGS. 2451-61. Regulating switches serve to control the heat output. Plans of wiring the cars are shown in FIGS. 2447-48.

ELECTRIC CAR LIGHTING. FIGS. 2622-40. There are a number of distinct systems of electric car lighting in limited use. These are the AXLE LIGHT SYSTEM, which see; the storage battery system, using batteries charged to last the entire run of the car or train; the auxiliary electric installations in the baggage car using live steam at about 90 lbs. pressure from the locomotive to drive a reciprocating engine or steam turbine which is connected to a dynamo supplying all the lights in the train. This latter system is in use on the limited trains between New York and Chicago and on some other trains in this country. The axle light system, which allows the independent operation of each car, is rapidly coming into use. Only on isolated cars on short runs is the storage battery system used at all.

ELECTRIC MOTOR. FIGS. 4774-7, 4783, 4815, 4888-95. A machine for transforming electric energy into mechanical motion; as applied to the propulsion of cars, it consist of a rotating armature within an enclosed steel magnet frame usually of a box shape. The whole is mounted on the truck and motion transmitted to the car by means of a pinion on the armature shaft and a gear on car axle. All standard railway motors are series wound and operate at a voltage of from 500 to 600.

ELECTRIC MOTOR CAR. FIGS. 4731-73. A car which is propelled by an electric motor, which is carried on the axle and truck and is geared to the axle and wheels. Such cars are also described as trolley cars, if they receive the current from a live wire through a trolley which is kept in contact with it; or as storage battery cars if they carry and derive the current for their propulsion from a storage battery.

ELECTRIC PUMP GOVERNOR. FIGS. 4862-63. An adjunct to the electrically driven air compressor, designed to automatically open or close the motor circuit when the air pressure in the reservoir exceeds or falls below certain predetermined limits; these limits are usually 90 and 80 pounds. Its function is to maintain a practically uniform air pressure in the main reservoir.

ELECTRIC PUMP GOVERNOR (Westinghouse Traction Brake). FIG. 995. See, PUMP GOVERNOR.

ELECTROLIER. FIG. 2690. A chandelier of electric lights.

ELLIPTIC SPRING. FIGS. 4138-49. A spring of elliptical form made of two sets of parallel steel plates of constantly decreasing length. Such springs are generally used for bolster springs for passenger cars. Their use in freight service has been practically abandoned in favor of spiral springs. Half elliptic springs are for locomotive springs. In England they are almost the only bearing springs used and are also used as DRAW AND BUFFING SPRINGS, which see.

The set of elliptic springs is the total amount of bend or compression of which the spring is capable. The arch differs from half the set by the amount of the thickness of the spring band. The connection between the two halves of the elliptic spring at its extremities is termed the scroll. Elliptic springs in service are termed double or duplicate, triplets or triplicate, quadruple, quintuple, sextuple, etc., according to the number of springs used side by side and connected by a single eye bolt so as to constitute practically one spring. In passenger car service elliptic springs are usually triplicates, quadruples, or quintuples. The length of the spring is the distance from center to center of scrolls

when unloaded; and the height, the height over all unloaded.

EMERGENCY CANDLE LAMP. FIG. 2775-76. See, PINTSCH BRACKET CANDLE LAMP. CANDLE LAMP.

EMERGENCY TOOL BOX. T, FIGS. 388-91. See, TOOL BOX.

EMERGENCY VALVE (Triple Valve). 10, FIG. 910. See, TRIPLE VALVE.

EMERGENCY VALVE NUT (Triple Valve). 28, FIG. 910.

EMERGENCY VALVE PISTON (Triple Valve). 8, FIG. 910.

EMERGENCY VALVE PISTON PACKING RING (Triple Valve). 30, FIG. 910.

EMERGENCY VALVE SEAT (Triple Valve). 9, FIG. 910.

EMIGRANT SLEEPING CAR. A cheaply finished car without springs or mattresses, but in other respects similar to ordinary sleepers, for the use of emigrants. Now used chiefly on the long runs west of Chicago, and to some extent used for ordinary travel, especially by parties of excursionists. See, TOURIST SLEEPING CAR.

END ARCH RAIL (English). American equivalent, end plate. A piece of timber run across the upper portion of the end of the body, its upper side being cut to the curve of the roof which it supports.

END ASCENDING STEP (English). See, ASCENDING RAIL.

END BELT RAIL. 50, FIGS. 159-69. (Freight Car.) A belt running across the end of a car about midway between the sills and plate, and with the side belt rail forming a continuous girth around the car except across the doors. It is usually the top of the inside lining and is framed into the posts and braces. See, END GIRTH.

END BELT RAIL TIE ROD. 51, FIGS. 159-69. A tie rod parallel to and alongside of the end belt rail to keep the posts drawn tight and close against the end belt rail.

END BOARD (English). American equivalent, end plank. A plank in the end of a "goods wagon" or gondola car.

END BRACE. 35, FIGS. 159-69, 185, etc.; 51, FIGS. 388-91. See, BODY BRACE.

END BRACE POCKET. 35, FIGS. 159-69., etc. See, POCKET.

END BRACE ROD. 34, FIGS. 159-69, 185-95, etc. See, BRACE ROD.

END CARLINE. A CARLINE (which see) at the end of a car body. See also, END PLATE. PLATFORM ROOF END CARLINE.

END CHUTE PLANK. The planking of an inclined floor of a car which discharges its load longitudinally from the end toward the middle of a car, or vice-versa. See, END SLOPE.

END COMPRESSION BEAM (Passenger Car Framing). A timber directly above the sills over the body bolster against which the compression beam brace and the end counterbrace abut. The compression beam proper is situated at the middle of the car directly under the window sills. The end compression beam is sometimes omitted.

END COUNTERBRACE (Passenger Car Framing). More commonly, simply counterbrace. A brace in the side of a car body, between its ends and the body bolster. See, COUNTERBRACE.

END DOOR (Box Cars). 1. A door frequently applied to afford means for the insertion of long pieces of freight or lumber that cannot be entered by the main side doors.

2. (Refrigerator Cars.) 61e, FIGS. 185-95.

END DOORS (Passenger Car). FIGS. 1026-34.

END DOOR LOCKS. FIGS. 2003-83, etc. See, LOCKS.

END DOOR SASH BOLT. FIGS. 3635-38, etc. See, SASH BOLT.

END DOOR SASH LIFT. FIG. 3636. See, SASH LIFT.

END FRAME (of a Car Body). The frame which forms the end of a car body. It includes the posts, braces, end rail, end girth, etc.

END GIRTH. 50, FIGS. 159-69; 49b and 49c, FIGS. 185-95. A girth in the end of a box car. An end belt rail.

END GIRTH TIE ROD. A rod extending across the end of a freight car body along the end girth, from one corner post to the other. An end belt rail tie rod.

END GRAB IRON. See, GRAB IRON.

END HALF LONGITUDINAL (English). American equivalent, intermediate sill. A part of the under framing extending from the cross bearer to the headstock.

END HOOK (Bell Cord). FIG. 1820. A hook sometimes used on the ends of passenger cars, high up under the platform roof, for fastening the end of the bell cord to.

END LAMP IRON (English). American equivalent, tail light holder. A wrought iron holder secured to the sole bar or the end of the body in order to carry one of the colored signal or tail lamps, denoting the last vehicle of the train. See also, SIDE LAMP IRON.

END MUNTIN (English). See, END STANCHION.

END PANEL. 1. A panel at the end and on the outside of a passenger or street car below the window. In street cars distinguished as lower and upper, both under the window. In passenger cars distinguished as end window panel, alongside of the window, and end panel, below it.

2. (English). A panel in the outside end of the body of a carriage, extending from the arch rail to the bottom end piece.

END PIECE (Wooden Truck Frame). 17, FIGS. 3735-3951, and FIGS. 3813-14, 3817-8. A transverse timber or bar of iron by which the ends of the two wheel pieces of a truck frame are connected together. A crooked end piece is one cut away on top to clear the draw gear. The inside end piece is the one nearest the center of the car, in distinction from the outside end piece. They are frequently designated as the front and back end piece.

END PIECE CORNER PLATE (Passenger Trucks). 130, FIGS. 3781-3951, and FIG. 3790. See, TRUCK FRAME CORNER PLATE.

END PIECE PLATE. FIGS. 3828-30. A top and bottom plate for the end piece of a passenger truck. Also side plates bolted to the end piece to further stiffen it. FIGS. 3839-40.

END PILLAR (English). An upright post in the end of the body.

END PLANK (of a Gondola Car). They are often hinged to the car floor so as to drop down upon it, when they are called drop ends.

END PLATE. 48, FIGS. 159-69, 185-95, etc. A timber across the end and top of car body and which is fastened to the two side plates. It is usually made of the proper form to serve as an end carline.

END PLATE STRENGTHENING ANGLE. An angle iron bolted or lag screwed to the top of the end plate between the side plates to strengthen the end plate and the connection between the sides.

END PLAY. 1. (Of an Axle.) The movement, or space left for movement, endwise.

2. (Of a Truck Bolster.) Usually called lateral motion. See, SWING BOLSTER.

END POST (Hopper Cars). 47, FIGS. 271-95. A vertical support for the overhang of the hopper floor, resting on the end sill. Ladder rounds are usually riveted to the two center end posts.

END POST. See, VESTIBULE END POST.

END RAFTER. A term erroneously applied to the END CARLINES, which see.

END RAIL. 1. See, WAINSCOT END RAIL (Lower and Upper).

2. (English.) A part of the body framing running horizontally across the end of the vehicle. See, SIDE RAIL.

END ROOF PANEL. The panel above the door and below the clear story.

END SCROLL IRON (English). A wrought iron support for the spring link adjusting screw. The upper face is attached to the under side of the sole bar, and the lower part is bored horizontally for the adjusting screw. It

is placed near the end of the vehicle, and hence differs somewhat in pattern from the ordinary scroll iron.

END SEAT PANEL (Street Car). An inside panel at the end of a longitudinal or side seat.

END SILL. 2, FIGS. 159-69, 185-95, 215-22, 246-50, 360-72, etc. The main outside transverse timber of a car body, into which all the floor timbers are framed. In passenger cars it comes directly under the door, the PLATFORM, (which see) with its various parts being a separate construction. In England the end sill is termed the head stock.

END SILL AND PLATE TIE ROD. 54, FIGS. 388-91. A tie rod joining the end sill with the end plate.

END SILL BRACKETS (of Iron Frame Cars). L-shaped angle plates used to connect the iron sills and the end sill channel bar. In bridge building such plates are termed brackets. When of triangular section they are termed GUSSETS, which see.

END SILL CHANNEL BAR. See above.

END SILL DIAGONAL BRACE. 195, FIGS. 159-69, 271-95; 11, FIGS. 271-95. A horizontal brace extending from the corners of the end sill diagonal back to or beyond the bolster at the center sills.

END SILL FLITCH PLANKS. The planks or sticks of timber which are placed on the sides or between the flitch plates, and are part of a composite end sill.

END SILL FLITCH PLATES. The iron or steel plates sandwiched between the wood members of a composite end sill.

END SILL STIFFENING ANGLE. Pullman anti-telescoping device. A ⅜x3x4 angle iron riveted or bolted to the end sill stiffening plate and to the end sill on the inside. The inner body truss rods pass through it, the end sill and the truss rod washer plate.

END SILL STIFFENING PLATE. Pullman anti-telescoping device. A ⅝-inch plate, 20 inches wide in the middle by 12 inches at the ends, bolted on the under side of the end sill and to the under side of the center, intermediate, and side sills.

END SLOPE (Hopper Car). 27a, FIGS. 271-95. The sloping floor from the end of the car to the hopper door. See, SIDE SLOPE and HOPPER SLOPE.

END STANCHION, OR END MUNTIN (English). An upright bar at the end of a wagon, stiffening the end against shocks in switching.

END STOP (Journal Box). A block inserted upon the inside of the lid to take up the end thrust of the axle. See, STOP JOURNAL BEARING and STOP KEY JOURNAL BEARING.

END TIMBER. See, PLATFORM END TIMBER OR BUFFER BEAM; also, END SILL.

END TRAIN PIPE VALVE (Steam Heating). FIGS. 2297-99, 2432-38, etc. A valve in the train pipe at the end of the car by which the entire car may be cut out. Usually operated by an extension handle extending up to the platform or out to the side of the car.

END TRUSS PLANK. See, TRUSS PLANK.

END VENTILATOR. An aperture for the admission or escape of air at the end of a car, usually placed over the windows. See also, DECK END VENTILATOR.

END VENTILATOR OPENER. See, DECK SASH OPENER.

END WAINSCOT PANEL. See, WAINSCOT PANEL.

END WINDOW PANEL. A panel at the end and on the outside of a passenger car alongside of the window, in distinction from the end panel proper, which is below the window.

ENGINE AND AIR PUMP COMPLETE (Air Brake). FIGS. 893-94, 965. A machine attached to a locomotive for compressing air. It consists of a steam and an air cylinder, the pistons in which are connected to the same piston rod, so that the air piston is worked directly by the steam piston. Suitable valves are provided for admitting and exhausting the steam and air to and from the cylinders. See, REVERSING VALVE, etc.

ENGINEER'S BRAKE VALVE (Westinghouse and New York Brake). FIGS. 907-09, 967-71. The valve now used, instead of the old three way cock, for applying and releasing the brakes. A valve device located in the cab of the locomotive for applying and releasing the air brakes. It is operated by the engineer through the medium of a projecting handle or lever. In the release position of the handle the air from the main reservoir has direct access, through a large port, to the train pipe. In the running position the air from the main reservoir has access to the train pipe only through the feed valve attachment, which operates to limit the pressure in the train pipe to 70 lbs. when it is 90 lbs. in the storage reservoir. In the position for service application of the brakes the air pressure is partially released from the chamber above a piston, which is then forced upward by the train pipe pressure below it, and opens a valve to the atmosphere, through which the train pipe air is discharged at such a rate that the emergency action of the triple valves on the cars cannot take place. Any degree of reduction of train pipe pressure may be effected in this way for graduated applications of the brakes. In the position for the emergency application of the brakes, a large direct port from the train pipe to the atmosphere is opened, which causes the instantaneous application of the brakes throughout the train.

ENGINE LAMP. FIG. 2726.

EQUALIZER. 1. A short term for an EQUALIZING BAR, which see.

2. (Janney Platform.) The bar connecting the two buffers and having a bearing against the center buffer spring.

3. (Pullman Vestibule.) 27, FIGS. 1784-86. A bar in the hood of a platform which equalizes the pressure of the two upper face plate springs and keeps the opposing face plates together in contact, so as to maintain frictional contact and exclude dust and smoke.

EQUALIZER BLOCK. See, BRAKE EQUALIZER BLOCK.

EQUALIZER CONNECTING CHAIN. 26, FIGS. 1784-86 (Pullman Vestibules). Three links of a chain connecting the upper ends of the vertical equalizing levers with the ends of the horizontal equalizing lever.

EQUALIZER SPRING. 79, FIGS. 3781-3951. A spring which rests on an equalizing bar and carries the weight of a car. Single or two group spiral springs are generally used for this purpose. Rubber and volute springs are out of use.

EQUALIZER SPRING BLOCK (Passenger Trucks). FIGS. 3969-71. A casting bolted to the wheel piece which rests on the equalizer spring cap.

EQUALIZER SPRING CAP. 72, FIGS. 3781-3951, and FIGS. 3784-6. A casting on top of the spring, which bears against the under side of the wheel piece and holds the spring in its place.

EQUALIZER SPRING SEAT. 73, FIGS. 3781-3951, and FIGS. 3787-9, 3972-4. A casting which sets on an equalizing bar and on which the spring rests. See, SPRING PLATE.

EQUALIZER STRAP. See, BRAKE EQUALIZER STRAP.

EQUALIZING BAR (Passenger Car Trucks). 71, FIGS. 3781-3951; FIGS. 3835-36, 4033-35, etc. Commonly abbreviated into equalizer. A wrought iron bar which bears on top of the journal boxes and extends longitudinally from one to the other. Equalizer springs rest on it between the two boxes. It is used to transfer part of the weight on one wheel to the other, and thus equalize it on both; hence its name.

EQUALIZING BAR PEDESTAL (Four Wheeled Caboose Cars). A casting serving to give a fulcrum to the center of an equalizing lever.

EQUALIZING BAR SEAT. The surface on top of a journal box on which an equalizer rests.

EQUALIZING BRAKE LEVER. A FLOATING LEVER, which see. The center brake lever is also, with little propriety, so called.

EQUALIZING LEVER. An EQUALIZING BAR, which see. A floating lever is also called an equalizing lever.

EQUALIZING RESERVOIR. A reservoir placed on the side of the locomotive underneath the cab, the office of which is to increase the volume of the chamber above the piston in the engineer's brake and equalizing discharge valve.

EQUALIZING VALVE (Westinghouse Brake). A valve for use on long trains to equalize the pressure in the brake pipe and prevent the inequality of pressure in the front portion of the pipe during the brief period in which the brakes are being applied by release of air from the brake pipes, from tending to first apply and then immediately release the brakes on the forward cars, owing to the rush of air from the rear portion of the train.

ESCUTCHEON. 1. FIGS. 1973-79, etc. A plate or guard for a key hole of a lock. Similar plates for the holes through which door knob spindles pass are also called escutcheons, but more commonly rose or rosette. See, SEAT LOCK ESCUTCHEON. An escutcheon plate is often attached to an escutcheon to cover the key hole.

2. (Yale Lock.) A revolving post provided with holes to carry the pins, which act as tumblers. When the key with corrugated edge is inserted each of these tumblers is raised so that the joint comes exactly at the edge of the escutcheon, thus permitting revolution.

ESCUTCHEON PLATE. See, ESCUTCHEON.

EXAMINATION OF CAR INSPECTORS. In 1902 the following rules for examination of car inspectors were adopted as a Recommended Practice of the Association:

Requirements:

One year at oiling cars.

Two years at car repairing.

Age limit for new men, thirty years.

Age limit for promoted men, forty years.

Vision, 20-20 in one eye and not less than 20-40 in the other, without glasses.

Method of Testing.—Acuity of Vision—The test card should be hung in a good light, and the party to be examined should, if possible, be seated with his back to the window. Each eye should be examined separately, using, for the purpose of excluding one eye, a folded handkerchief. The lowest line that can be read should be determined by exposing only one letter at a time through a hole cut in a strip of cardboard. In making out the report in each case the visual acuity of each eye should be denoted by a fraction of which the numerator represents the number of feet at which the applicant is seated from the card, while the denominator represents the number of feet at which the lowest line which he can read should be read. Thus, if at 20 feet he reads the line marked 20 feet, his vision—20-20 or 1, which is the normal standard. If at the same distance he only can read the line marked 70 feet, his vision—20-70. If at 20 feet he reads the 15 foot line, the vision —20-15, or more than normal. If a room 20 feet long can not be used a testing distance of 15 or 10 feet should be employed, in which case normal vision would be represented by 15-15, or 10-10 respectively, and lower grades of vision by such fractions as 15-20, 10-70 and so on.

Field of Vision.—Test should be made by having the applicant and examiner stand about three feet apart, each with one eye shut, looking each other steadily in the eye. The examiner should then bring his hand in from the edge of the field toward the center of the space between them, until the applicant sees it coming. This should be done from different directions, up, down and from each side. The applicant should see the hand coming about as soon as the examiner does. If not, this should be noted on the report.

Hearing.—Test should be made in a quiet room. First, the examiner should hold the watch opposite the ear to be examined not less than 48 inches distant, then gradually approach the ear until the applicant hears the tick, the stop being used to satisfy the examiner that the applicant is not deceiving. The distance at which the applicant hears the watch should be noted in inches. The normal ear should hear the tick of the watch at 48 inches. Then the hearing power will be denoted by a fraction whose numerator represents the number of inches at which the watch is heard. Thus, if he hears the watch at 48 inches, his hearing—48-48, or normal. If he hears it at only 10 inches distant, his hearing—10-48, and so on.

Color.—The committee does not think it essential that inspectors should be rejected on account of imperfect color sense. It is, however, believed that inspectors should be tested as to their color sense, so that they, as well as their employer, may know their condition in this respect.

Educational.—The applicant should be able to write a legible hand in English, and also to read manuscript, as well as printed matter.

Car Knowledge.—The inspectors should be able to name each part of the cars in general use, in preference using M. C. B. dictionary terms.

M. C. B. Rules.—Inspectors must pass a satisfactory examination on M. C. B. Rules, answering seventy-five per cent. of the questions submitted. These questions should be of about the following character:

1. What are the Master Car Builders' Rules?
2. What is the object of the M. C. B. Rules?
3. What is the underlying idea or principle of these rules?
4. When is a company, operating the cars of another company, responsible for defects of such cars?
5. When a company is thus responsible, what should it do?
6. What care should be given to foreign cars by the company hauling them?
7. What cars must be accepted in interchange?
8. What is a defect card, and how is it used?
9. Under what conditions is a road obliged to accept a car which is carded for defects for which the owner is not responsible?
10. What are the defects of wheels and axles for which owners and delivering companies are responsible?
11. Describe the form and use of the M. C. B. wheel gage.
12. What are the rules which apply to the cleaning of triple valves and cylinders?
13. What does the limit of height of drawbars mean?
14. When a company is obliged to make improper repairs, what must it do to call attention to such repairs?
15. What does the term unfair usage mean?
16. What are the rules regarding splicing sills?
17. What is the purpose of the repair card?
18. How do these rules apply to switching roads?
19. Are switching roads allowed to render bills against owners direct for repairs of any other than those named in Section 23 of Rule 5?

EXCELSIOR CAR ROOF. FIGS. 1738-47. See CAR ROOF.

EXCELSIOR GALVANIZED CAR ROOF. FIGS. 1743-47. See, CAR ROOF.

EXCELSIOR STEAM TRAP AND PARTS (Gold Car Heating System). FIGS. 2355-84, 2394. An automatic THERMOSTATIC STEAM TRAP, which see.

EXHAUST PIPE (Air Pump). A pipe through which the exhaust steam is conveyed from the steam cylinder to the smokestack.

EXHAUST PIPE UNION (Air Pump). 58-60, FIG. 965.

EXHAUST VENTILATOR (for Closet Hoppers). FIG. 3103. See, BELL'S EXHAUST HOPPER VENTILATOR.

EXPANDED METAL. A perforated metal screen which is

made by slotting a sheet of sheet iron or steel and then drawing it out so that the slots form diamond shaped holes in the plate. It is largely used in composite concrete construction as a binder, in the "Diamond S" brake shoe (FIGS. 1007, 1016), for lockers and for window guards (FIGS. 3063-64).

EXPANSION DRUM (Baker Heater). FIGS. 2208, 2222, etc. A CIRCULATING DRUM, which see.

EXPRESS CAR. FIG. 120. A car for carrying light packages of freight for express companies on passenger trains. Also see, COMBINATION BAGGAGE CAR.

The express business was originated in 1839 by William F. Harnden, who traveled for some time as a messenger between New York and Boston; but it was not for a long time thereafter that it grew to sufficient dimensions to require separate cars. Alvin Adams, founder of the Adams Express Company, began business in 1840. At present complete trains of express cars are occasionally required.

EXTENSION PILLAR (Pintsch Lamp). 303, FIGS. 2605-21.

EXTENSION PILLAR LOCK (Pintsch Lamp). 304, FIGS. 2605-21.

EXTENSION REACH (Logging Cars). The reach is a long bar connecting the two trucks. The extension reach is adjustable.

EXTENSION REACH END (Logging Cars). A strap for the end of the extension reach.

EXTERNAL CYLINDER GAGE. A steel ring with a cylindrical hole, which is very accurately made of a precise size, and used as a standard of measurement for the diameters of solid cylindrical objects.

EXTERNAL SCREW GAGE. A steel ring with a very accurate screw thread in the inside for testing screw threads. See, INTERNAL SCREW GAGE.

EXTRA TRANSOM (Passenger Trucks). FIGS. 3811-12. An extra or auxiliary timber placed alongside the transom to further strengthen the truck frame.

EYE. "A small hole or aperture."—Webster. See,

BODY CHECK CHAIN EYE.
BERTH BRACE EYE.
BULL'S EYE.
CHECK CHAIN EYE.
LAMP CASE EYE.
BRAKE BEAM ADJUSTING HANGER EYE.
SWITCHING EYE.
TRUCK CHECK CHAIN EYE

EYE BOLT. 1. "A bolt having an eye or loop at one end for the reception of a ring, hook or rope, as may be required."—Knight. See, BOLT; also

BRAKE BEAM EYE BOLT.
EYE BOLT.
BRAKE SAFETY CHAIN
LOCK EYE BOLT.
LOCK CHAIN EYE BOLT.

EYE BOLT LINK HANGER. A special form of SWING HANGER, which see, having a very short link attached to an eye bolt passing through the transoms.

EYELET. 1. FIGS. 2167-69. "A short metallic tube, the ends of which are flanged over against the object through which it passes. Used as a bushing or reinforcement for holes."—Knight. In metallic eyelets of the usual form the two halves which when compressed together form the eyelet are known as grommets. See, CARPET EYELETS.

2. (Window Shade.) A slot in the window shade leather to fit over the sash lift to hold the shade fast.

EYELET NAIL. FIG. 2170. A wire nail with turned knob for use with carpet eyelets.

F

FABRIKOID. An artificial leather made by coating a cloth fabric with a secret compound which gives it the texture and appearance of leather.

FACE (of Rim of Car Wheel). The vertical surface of the outside of the rim.

FACE PLATE. 1. A metal plate by which any object is covered, so as to protect it from wear or abrasion. A journal box lid is sometimes called a face plate. See,

BERTH LATCH FACE PLATE.
BUFFER BLOCK FACE PLATE.
DRAWBAR FACE PLATE.
END FACE PLATE.

2. (Steel Tired Wheels.) FIGS. 4178-83. The plates connecting the tire and hub, and bolted to each. They are distinguished as front and back face plates.

FACE PLATE. See, VESTIBULES.

FACE PLATE BUFFER. A buffer plate to which a vestibule face plate is attached.

FACE PLATE BUFFING STEM (Pullman Vestibule). See, FACE PLATE PISTON.

FACE PLATE PISTON (Vestibules). 24, FIGS. 1784-86. A face plate buffing stem corresponding to side buffer stem, beneath the platform floor. The end is contained in a face plate piston guide, 29.

FACE PLATE PISTON GUIDE. 29, FIGS. 1784-86. See above.

FACING. "A covering in front for ornament."—Webster. See, DECK SILL FACING.

FAGGOTED AXLE. See, AXLE. CAR AXLE.

FALL (Hoisting Tackle). That part of the rope to which power is applied.

FALL AND TACKLE. Another name for BLOCK AND TACKLE, which see.

FALLING DOOR, OR FLAP DOOR (English). In a gondola car a door opening downward and outward, the hinges being on the lower side.

FALLING DOOR LATCH (English). A latch which automatically secures the falling door when elevated into a closed position.

FALL UNDER, OR TURN UNDER (English). The distance which the bottom of the body curves in from a vertical line let fall from the sides or ends.

FARE REGISTER (Street Cars). A mechanism with a clock face and index or with a numbering dial which shows the number of fares collected and registered. For every fare collected the conductor is expected to record it by pulling a cord or turning a rod connected with the register. The register is attached to a fare register block which is fastened to the car frame.

FASCIA BOARD. See, EAVES FASCIA BOARD. INSIDE CORNICE FASCIA BOARD. INSIDE CORNICE SUB-FASCIA BOARD.

FASCIA MOLDING (English). See, WROUGHT MOLDING.

FAST BERTH HINGE. FIG. 3424. See, BERTH HINGE.

FAST JOINT BUTT HINGE. FIG. 1961. See, HINGE. So called in distinction from a loose joint butt hinge or loose pin butt hinge.

FASTENER. See,

BERTH SAFETY ROPE FASTENER.
LAMP FASTENER.
SASH FASTENER.
TIRE FASTENER.
WINDOW FASTENER.

FAUCET. FIGS. 2763-69. A synonymous term with COCK, which see for fuller definition.

FAUCET ALCOVE. A WATER ALCOVE, which see.

FEED DOOR (Baker Heater). FIGS. 2188, etc. A door for closing the aperture giving access to the fire pot or (in base burners) magazine. See also, FIRE DOOR.

FEED TUBE (Lamp). 31, FIGS. 2694-2710. The tube connecting the reservoir with the burner. The standard by which the entire lamp is supported passes through it.

FEED VALVE. 1. (Westinghouse Air Brake.) FIGS. 907-9. An auxiliary valve attached to the engineer's brake valve and consisting of a feed valve body, 51, cap nut, 53, piston, 54, spring, 56, stud, 30, case gasket, 27, and other essential parts.

2. (New York Air Brake.) FIGS. 968-71. The corresponding parts are, feed valve cap, 98, feed valve, 97, feed valve spring, 90, etc.

3. (Signal Valve.) The valve regulating the supply of air from the main reservoir to the signal line.

FELT EDGE (Car Seats). A device for building up the edges of car seat cushions. It is simply a roll of felt stitched in such a manner as to fit over a cleat; and when tacked down it forms an even elastic face to the cushion.

FEMALE CENTER PLATE. The body and truck center plates are sometimes called male and female plates. See, CENTER PLATE.

FEMALE GAGE. An EXTERNAL GAGE, which see.

FENDER BOARD. A board at the end of passenger car steps to prevent mud and dirt from being thrown on them by the wheels. More commonly, string board. The splash board, if used, goes on the back side of the steps.

FENDER RAIL (Street Car Bodies). A longitudinal exterior rail, between the belt rail and the sill, and to which an iron strip called a fender guard is attached to protect the panels from contact with other vehicles.

FERRY PUSH CAR. A very long platform car used for pushing or pulling other cars on or off a ferry boat when the latter is approached by an incline too steep for locomotives, so that the latter can push or pull the cars without running on the incline.

FIBER PACKING. See, ELASTIC FIBER JOURNAL PACKING. PATENT WASTE.

FIELD COILS. 6, FIGS. 4783-4815. Coils of insulated copper wire or ribbon surrounding the iron poles of the railway motor field magnet. Standard motors have four poles. Current passing through these coils produces the magnetic flux in which the armature rotates.

FILLET. A small light molding, more generally termed beads. See, MOLDING.

FILLING FUNNEL (Baker Heater). FIG. 2269. A funnel attached to the combination cock for filling the circulating drum with brine.

FILLING PIECE. Any piece of timber which has no other structural purpose than to close a gap.

FILLING SPIDER (Pressed Steel Bolster). FIGS. 507-8.

FILLING VALVE (Pintsch System). FIG. 2468. This valve is a soft metallic seated valve of peculiar construction. Is handled with key No. 45 (FIG. 2512) and is a left handed valve. It is placed on each side of a car, bolted to an iron bracket, FIG. 2469, by bolts, FIG. 2502. The pipe connection (¼ in.) is made to connection piece, FIG. 2474, which is slipped through the bracket from the outside and screwed to the pipe. The filling valve is then bolted back against this flange connection piece, a lead and rubber gasket forming the tight joint.

The valve has a sheet iron cover, FIG. 2467, secured to it by four screws.

FINGER GUARD (Brake Beams). FIGS. 847-51, etc. A projecting rod or finger which prevents the brake beam from being excessively displaced laterally by bearing on the inside of the wheel.

FINISHED UPPER SEAT BACK RAIL (Street Cars). The topmost rail or molding of a longitudinal seat back.

FINISHING VARNISH (Painting). An elastic (oily) varnish applied in two coats. The first is allowed at least 24 hours to dry. The second and fuller coat of the same varnish is then applied and allowed 24 hours to dry. A first class job can be turned out in 10 days. Additional time between coats will give additional safety. See, PAINTING.

FIRE BOX, OR FIRE POT (Baker Heater). FIG. 2201, etc. The inside cast iron cylinder which contains the fire. It is cast in one piece and contains the coil. Also called fire chamber, fire box, furnace, and sometimes cylinder.

FIRE EXTINGUISHER. FIG. 2969. See, BABCOCK FIRE EXTINGUISHER.

FIRE GRATE, AND FIRE GRATE SUPPORT. See, GRATE and GRATE SUPPORT.

FIRE PROOF HEATERS (Baker). 1. Single Coil. FIGS. 2180-99. A Baker heater having a single coil, 30 feet in length, FIG. 2189, or a double coil, FIG. 2214, in a flexible steel, jointless fire proof safe, with no apertures large enough to permit the escape of live coals. This inner fire pot or safe is enclosed in a flexible steel outside casing, with asbestos sheets between the safe and casing, and between the ash pit bottom and sheet iron bottom; a safety plate covers the feed chute at the top, and a cinder proof door effectually closes the ash pit at the bottom. The smoke pipe and smoke flue base may be destroyed and leave the fire pot practically fireproof.

2. Two coil. FIGS. 2200-20.

FIRE REGULATOR AND PRESSURE INDICATOR. FIG. 2182. The device is attached to the hot water circulating pipes at a point a little above the coils, and is somewhat after the old ball and lever safety valve, the ball or weight in this case being the draft door. The fire regulator bowl consists of two concave plates bolted together, with a corrugated steel diaphragm and two copper duplicates, top and bottom, between (for preservation). On this set of diaphragms rests a piston connected with a lever, on one end of which hangs the counter draft damper in the base of the smoke flue. On the front end of this lever is the spiral adjusting spring, and the figures denoting the pressure within the heater. The "adjusting spring" is to be hooked into the hole at the figures denoting the pressure and consequent temperature desired.

FIRST CLASS CAR. The ordinary American day coach used by the great bulk of short trip passengers. So called to distinguish it, on the one hand, from those of an inferior grade, as emigrant and (rarely) second class cars, and on the other hand from sleeping and parlor cars, and in which an extra charge, in addition to the ordinary fare, is made, and which are the true American first class cars.

FIRST CLASS CARRIAGE (English). Nearest American equivalent, parlor or drawing room car. A coach for passengers paying the highest rate of fare. It is divided into four or more compartments, each about 7 feet cube, and seating six or eight passengers.

FISH VAN (English). A covered vehicle adapted to run on passenger trains, and fitted to carry fresh fish in crates or boxes. When without a roof it is termed a fish truck.

FITTINGS. FIGS. 1810-3728. FURNISHINGS, which see.

FIXED BRAKE LEVER. More commonly, dead lever. A brake lever, the upper end of which is fastened to a brake lever stop or dead lever guide.

FIXED HANGER (Bell Cord). FIG. 1868. See, BELL CORD HANGER.

FIXED RATCHET (Morgan's Deck Sash Pivot). FIGS. 3554-5. The piece attached to the side of the window frame with which the sash ratchet engages, the latter being pressed against it by a spring.

FIXED OR STATIONARY FREIGHT CAR LOCK. FIGS. 2091-96. A lock which is attached to the side of a car. The bolt or hasp is fastened to the door.

FLAG (for Train Signals). The standard size of flags adopted by the American Railway Association is 16x16 inches, and the colors indicate their purpose as follows: Red signifies danger and is a signal to stop; green signifies caution and is a signal to go slowly; white signifies safety and is a signal to go on; blue denotes that car inspectors are at work under or about the train or car, and that it cannot be moved or coupled to until the blue signal is removed by the car inspectors. In the night time lanterns with colored glass globes are used instead of flags, and the colored lights have the same meaning as the colored flags.

FLAG HOLDER (for Corner Post of Passenger Car). FIGS. 2711-25. A cast or malleable iron receptacle for a signal flag staff. It has a lug cast on it which engages into a flag holder plate attached to the corner post.

FLAG HOLDER PLATE. See above.

FLANGE. 1. (Of Bell Cord Guides, etc., etc.) FIGS. 1883, 1885, etc. A projecting rim for attaching the part to any surface by wood screws.

2. (Of a Car Wheel.) FIG. 4370. A projecting edge or rim on the periphery for keeping it on the rail. The

inside edge of the flange which connects with the tread of the wheel is termed the throat, and the extreme outer point the toe of the flange. Worn flanges having flat vertical surfaces extending more than 1 inch from tread of wheel, or 1 inch thick or less, are a cause for rejection under the rules for interchange of traffic. See, WHEELS. The standard distances fixed by the Master Car Builders' Association, from outside of flange to inside of tread in surface, is 4 feet 5⅜ inches, with ¼-inch variation either way. See, INTERCHANGE RULES. See, FLANGE GAGE.

FLANGE BRAKE SHOE. FIGS. 1003-11, etc. See, ROSS BRAKE SHOE.

FLANGE GAGE, OR DISTANCE GAGE. FIGS. 4371-2. A gage for determining the correctness of the distance between inside and outside of flanges. The dimensions shown in the engravings are those adopted by the M. C. B. Association.

FLANGE FITTINGS (Pintsch System). FIGS. 2477-84. Special fittings required for the Pintsch system are all flanged and made of brass, the flanges held together by screws. The joints are made tight by the use of special lead and rubber washers.

FLANGER. See, SNOW FLANGER.

FLAP DOOR (English). See, FALLING DOOR.

FLASHING. "Plumbing. A lap joint used in sheet metal roofing, where the edges of the sheets meet on a projecting ridge. A strip of lead leading the drip of a wall into a gutter."—Knight. Hence, extended to mean any strip of sheet metal of an L section used to make a water tight joint.

FLAT CAR. FIGS. 15-20, 223-38. A car, the body of which consists simply of a platform, which is not inclosed on the sides or top. The floor is usually of wood, but some cars have been built with steel underframe and steel floor. If sides are added it becomes a gondola car. See, CAR and FREIGHT CAR.

FLAT DOOR BOLT. FIG. 1899. See, DOOR BOLT.

FLEXIBLE TOP SEAT CUSHIONS. A seat cushion, the top of which is in detached parts so that one part can yield without carrying down the other.

FLITCH PLATES. An iron or steel plate sandwiched between pieces of wood and bolted together to give the member which they comprise greater strength. Also called sandwich plates.

FLOATING CONNECTING ROD (Westinghouse Brake). A rod which connects a cylinder lever with a floating lever.

FLOATING LEVER. (Westinghouse Freight Brake.) A lever, to the middle of which the push rod is attached, each end being connected directly to the live lever of each truck.

FLOATING LEVER BRACKET. A bracket bolted to the under frame of a car to carry the floating lever of brake gear.

FLOATING LEVER CONNECTING ROD. (Brake Gear.) More properly a CYLINDER LEVER TIE ROD, which see.

FLOOR. 1. "That part of a building or room on which we walk; the bottom or lower part, consisting, in modern houses, of boards, planks or pavement.

2. "A platform of boards or planks laid on timbers, as in a bridge or car; any similar platform."—Webster.

3. 27, FIGS. 159-69, 246-47, 271-95, 360-72, etc. The boards which cover the sills of a car. In passenger cars the floor consists of two, and sometimes three, courses of boards, called respectively the flooring, intermediate floor and deafening ceiling, the latter being on the under side of the sills. An intermediate or upper floor, 28, more commonly called the double deck, is used in stock cars for carrying sheep and hogs. Hopper bottom cars have an inclined floor, subdivided into inclined end floor and side floor when both are used.

FLOOR BEAM. A SILL, which see.

FLOOR FRAME. The main frame of a car body underneath the floor, including the sills, body bolsters, needle beams, etc. The underframe.

FLOOR FURNISHINGS. FIGS. 2167-78.

FLOOR JOIST. A floor timber.

FLOOR MAT. FIGS. 2174-75. A texture or structure of hemp, cocoa fiber, rattan, india rubber, wood or other material laid on the floor of a car for passengers to clean their boots and shoes on. Mats are placed on the floors of street cars to take up the dust and dirt. See, COCOA FIBER. WOOD FLOOR MAT. RUBBER FLOOR MAT. The latter is either perforated or corrugated.

FLOOR PIPE (for Closet Hoppers). A pipe passing through the floor of the car only, with which the hopper proper is connected.

FLOOR STOP. 1. (For Door Holder.) FIGS. 2134-5. A catch for a door holder attached to the floor, in distinction from a partition stop attached to the wall or partition. See, DOOR HOLDER.

FLOOR STRIP. The strips that make the grated floor frames of a street car.

FLOOR TIMBERS. 1, 3, 4, FIGS. 159-69, 360-72, etc. The main timbers in the frame of a car body underneath the floor, and on which the latter rests. They are chiefly the sills (side, center, and intermediate) and the end sills. They are a part of the underframe. See also, DIAGONAL FLOOR TIMBER. INCLINED FLOOR TIMBER. TRANSVERSE FLOOR TIMBER.

FLOOR TIMBER BRACES. 7, FIGS. 388-91, etc. Diagonal timbers let into the sills under the floor to stiffen the floor frame laterally.

FLOOR TIMBER DISTANCE BLOCK. A short transverse piece of timber placed between adjoining floor timbers and sills to stiffen them, the whole being fastened together with bolts in connection with a cross frame tie bolt. In iron frame cars tie plates are riveted across the top of the sills to subserve the same purpose. See, BRIDGING.

FLOORING. Tongued and grooved boards of which a passenger car floor is made. The floor of freight cars is commonly two-inch planking.

FLUE (Pintsch Lamp). 312, 321, FIGS. 2605-21.

FLUE POST (Pintsch Lamp). 546, FIGS. 2605-21.

FLUSH BOLT. FIGS. 1899-1901. A bolt attached to a slide which is let into a door, sash or window, so as to be flush with its surface. A spring flush bolt is commonly called a cupboard catch. FIGS. 1902-07.

FLUSH BOLT KEEPER. FIG. 1903. A plate which is attached to a door, sash or window frame, and has a suitable hole, in which a flush bolt engages. When for spring bolts, as in the engraving, they are also called strike plates.

FLUSH CATCH. FIGS. 1902-07.

FLUSH HANDLE. FIGS. 1922-35, etc. A handle for a lock or latch which is placed in a recess, as of a door, sash or berth, and which does not project beyond the surface of the object to which it is attached.

FLUSH SASH LIFT. FIG. 3682. A metal plate with a recess, to take hold of, which is let into a sash so as to be flush with its surface.

FOLDING ARM REST, OR ELBOW REST (English). A wooden support for the elbow, upholstered on both the upper and lower sides and fitted with a spring hinge, so that it can be turned up to lie flat against the back of the seat in order to allow a passenger to lie down at full length on the seat.

FOLDING CURTAIN ROD BRACKET. 15, FIGS. 1778-83. See, CURTAIN ROD BRACKET.

FOLDING LAVATORY. FIGS. 2802-5. A device for the staterooms of sleeping, private, and business cars, which can be folded out of the way and out of sight.

FOLDING PLATFORM TAIL GATE. FIGS. 3053-54. A gate for the end door or face plate door of a vestibule.

FOLDING WASH STAND. FIGS. 2802-05. A lavatory for the staterooms of compartment sleepers.

FOLLOWER. A very common abbreviation for a FOLLOWER PLATE, which see.

FOLLOWER BOLT. A piston follower bolt. See, PISTON.

FOLLOWER LUG. A DRAWBAR STOP, which see.

FOLLOWER PLATE. See, DRAWBAR FOLLOWER PLATE. PISTON FOLLOWER PLATE. The word "plate" is frequently omitted from these names.

FOOT BOARD. 1. (Freight Cars.) See, BRAKE STEP.

2. (English.) (Upper and Lower.) American equivalent (Street Cars), longitudinal step. Two continuous steps running along the sides of a carriage or brake van, the upper a short distance below the doors and slightly above the level of highest station platform; the lower about 18 inches from the rail level. They form steps and prevent any person falling between the train and the platform.

FOOT BOARD BRACKET. See, BRAKE STEP BRACKET.

FOOT PLATE (Janney Platform). 655, FIGS. 1526-1613. A cast iron wearing plate on the upper side of the passenger platform end rail. In platforms taking vestibules a sliding foot plate is attached to the buffer plate and works or slides back and forth in a foot plate housing.

FOOT PLATE BOLT (Janney-Buhoup Platform). 660, FIGS. 1526-1613.

FOOT PLATE HOUSING. 139, FIGS. 1526-1613. See above.

FOOT PLATE STOP (Janney-Buhoup Platform). 665, FIGS. 1526-1613.

FOOT RAIL. 23, FIGS. 3151-52. A horizontal wooden bar underneath a car seat for the passengers who occupy the next seat to rest their feet on. These fixed foot rails are often called foot rests, but such use is confusing, since the term FOOT REST, which see, is applied to many forms of adjustable foot rests. 23, FIGS. 3151-52. See, SIDE FOOT REST.

FOOT REST. 23, FIGS. 3151-52, and 29, FIGS. 3169-91. Any movable support for the feet of passengers, especially two horizontal wooden bars underneath a car seat, and attached to two iron rockers, called foot rest carriers, pivoted in the center so that it can be adjusted to a comfortable position for the passenger occupying the next seat, or moved out of the way if desired. Another style is an adjustable foot rest sliding in a grooved channel. A portable stuffed carpet foot rest is usually termed an ottoman or hassock.

FOOT REST CARRIERS. See above.

FOOT REST ROD BRACKET. FIGS. 2877-78.

FOREFOOT SHEAVE (Steam Shovel). 34, FIGS. 357-59.

FOREIGN CAR. Any car not belonging to the particular railroad on which it is running, including LINE CARS, which see. By the established rules for interchange of traffic all such cars are, or are supposed to be, inspected before entering on the lines of a foreign corporation, and "if an accepted foreign car is injured upon a road it shall be repaired by and at the expense of the company in possession thereof as promptly as it repairs its own cars." The cost thereof is sometimes charged to the owner of the car and sometimes not, according to an elaborate system of rules adopted by the M. C. B. Association, revised annually. See, INTERCHANGE RULES.

FORNEY SEATS. FIGS. 3182-3223. See, SCARRITT-FORNEY SEATS.

FORSYTH AIR AND STEAM COUPLER. FIGS. 890-890a. See, AUTOMATIC AIR AND STEAM HOSE COUPLER.

FORSYTH CURTAIN FIXTURES. FIGS. 3711-12.

FOUNT. See, LAMP FOUNT.

FOUNTAIN CAR WASHER. FIG. 2965. A car washer which has a stream of water passing through the brush at the will of the operator.

FOUR ARM LAMPS. FIGS. 2583-98, etc. See, PINTSCH LAMPS.

FOUR WAY COCK (Westinghouse Brake). A tapered conical spindle, with two passages in it which form a faucet for opening and closing communication between the brake cylinder, reservoir and brake pipe.

FOUR WHEEL TRUCKS. FIGS. 3729-3946.

FOR SOLID PRESSED STEEL CAR TRUCK. FIGS. 3732, 3757-59. A truck, the frame of which is wrought and hydraulic forged of steel plate consisting of few pieces which are all riveted together. It is a pedestal truck with journal box springs, with transoms, but no bolster or spring plank. The details are fully shown.

FRAME. 1. The outline or skeleton upon which a structure is built up. In a car the framing is usually supposed to mean the side frame, as distinguished from the floor or underframe, unless otherwise so expressed. The leading types of freight car frame are shown in FIGS. 159-342, etc. See, BASTARD HOWE. BASTARD PRATT. The leading styles of passenger car framing are shown in FIGS. 360-72, etc., and, in perspective view, FIGS. 380-87, The framing of street cars is shown in FIGS. 4748-73, with the dimensions of parts and over all. A marked innovation in the framing of passenger cars is the introduction of iron in combination with wood. This is shown in the so-called composite framing of FIGS. 433-5. In freight car framing the general use of structural shapes for bolsters, sills, spring planks, etc., should be noted.

2. (Of a Door, Ventilator, Window Sash, Mirror, etc.) The rectangular or curved border surrounding or inclosing it. See,

BERTH SPRING FRAME.
CONTINUOUS TRUCK FRAME.
CUSHION FRAME.
DOOR FRAME.
END FRAME.
FIRE DOOR FRAME.
GRATE FRAME.
LEVER FRAME.
MATCH STRIKER FRAME.
MIRROR FRAME.
NAME PANEL FRAME.
REGISTER FRAME.
SIGNAL BELL FRAME.

FRANKLIN INSTITUTE SYSTEM OF SCREW THREADS. The SELLERS SYSTEM OF SCREW THREADS, which see, is often called the Franklin Institute system because the former was first proposed in a report to, and was recommended by, the Franklin Institute.

FREE AIR SPACE (Refrigerator Car Insulation). An air space which has free communication with the outside air so that the air it contains can circulate and be replaced by fresh air.

FREIGHT CAR. FIGS. 1-68, 159-342. A general term used to designate all kinds of cars which carry goods, merchandise, produce, minerals, etc., to distinguish them from those which carry passengers. English term, wagon. For varieties of freight cars see, CAR.

FREIGHT CAR LOCK. FIGS. 2091-96. A lock for fastening the doors of freight cars. The usual freight car lock is simply a hasp, staple, pin and seal, but stationary or fixed freight car locks are in increasing use.

FREIGHT CAR TRUCKS. FIGS. 3729-80.

FREIGHT TRUCK. A two-wheeled vehicle, universally used about stations for loading and unloading freight. A baggage barrow is much the same. Baggage barrows and freight trucks are both sometimes designated as freight or baggage barrow trucks.

FRESNEL LANTERN. A lamp inclosed in a cylindrical FRESNEL LENS, which see. They are more used in marine than in railroad service.

FRESNEL LENS. A lens formed of concentric rings of glass or other transparent substances, one or both sides of which are bounded by spherical surfaces. The object of making a lens in this form is to reduce its thickness in the centre, and thus lessen the liability of having flaws and impurities in the glass, and also to reduce the absorption and aberration of the rays which pass through it. Such lenses are also made of a hollow, cylindrical form, and used to inclose signal lamps. The outside of the glass is formed of successive rings, the external surfaces of which are bounded by spherical surfaces.

What is known to the trade as a semaphore lens is a Fresnel lens with the inner surface concave.

FRICTION BLOCK. See, SWING HANGER FRICTION BLOCK and FRICTION PLATE.

FRICTION PLATE. 1. FIGS. 3791-93 (Four Wheel Truck).

A BOLSTER CHAFING PLATE, which see. 2. The body and truck side bearings are sometimes called friction plates. 3. The plate screwed to the wall to protect the wood work from chafing by the seat back arms when the seat back is tilted. See, CHAFING PLATE.

FRICTION ROLLER. A wheel or pulley interposed between a sliding object and the surface on which it slides to diminish the friction. See, CAR DOOR HANGER. SLIDING DOOR FRICTION ROLLER.

FRIEZE. That portion of a passenger or street car body on the outside, between the cornice or eaves of the roof and the tops of the windows. The letter board occupies this space.

FRIEZE VENTILATOR. See, VENTILATOR.

FRIEZE VENTILATOR PLATE. A perforated metal plate placed on the outside of a frieze ventilator to exclude rain and cinders from the car.

FRONT. See, ASH PIT FRONT. ALCOVE FRONT. WATER ALCOVE FRONT.

FRONT CAP (Triple Valve). 126, FIGS. 959-62.

FRONT FACE PLATE (Steel Tired Wheels). See, FACE PLATE.

FRONT SEAT BOTTOM RAIL (Street Cars). See, SEAT BOTTOM RAIL.

FROST DRY CARBURETOR SYSTEM OF CAR LIGHTING. The light in this system is produced by burning at the lamps a gas generated in the carburetors, which are placed on top of the car. The gas is simply air carrying a certain amount of gasoline vapor. The air is taken from the air brake service; the gasoline, absorbed by wicking, is contained in the carburetors, and the object of the details of this system is to bring these two elements together and thus produce a gas. The supply of air is taken from the end of the auxiliary reservoir and enters the air tank after passing through the combined dust guard and check valve. This valve frees from dirt the air which passes through it and acts as a check to retain the supply of air stored in the tank at such times as the pressure is withdrawn from the brake system. The air tank also serves as a storage reservoir, and its capacity is such that, when charged to the pressure ordinarily carried in the air brake system, the air contained therein will sustain the lights several hours after the car is detached from the train. A tank valve placed at each end of the tank controls the retention of air. The air pipe conducts the air to the saloon, where the air gage indicates the pressure in the air tank, and the closet valve directly controls the supply of air to the carburetors. From the closet valve the air passes through the regulator, where it is reduced in pressure to 1½ pounds, which pressure is practically constant on all parts of the system beyond this point. The course of the air next taken is through the mercurial check valve and the roof pipe to the carburetors. After entering the carburetors, the air moves slowly through a spiral passage, sixty feet in length, packed solidly with cotton wicking saturated with gasoline, and absorbs sufficient of the volatile oil to produce the desired gas which is consumed by the lamp directly beneath. This system was at one time in general use on the Pennsylvania, Norfolk & Western, and several other prominent roads.

FRUIT CAR. FIGS. 7, 208-11, etc. A car of special design for the carrying of fruit and other perishable products requiring ventilation. The ventilators are so arranged that they can be opened and closed while the car is in motion, so that there may be a constant stream of fresh air passing through the car. Ice is not used generally, but it is used in cars carrying fruits from California to eastern markets.

FULCRUM. 1. "In mechanics, that by which a lever is sustained, or the point about which it moves."—Webster. See, BRAKE LEVER FULCRUM.

2. (For Propelling Lever of Hand Car.) 32, FIGS. 4722-27.

FULCRUM HANGER CARRIERS. FIGS. 3952-3. A cast bracket which is bolted to the iron transom of a six wheel truck to carry the brake lever hanger bridge. The brake lever connection rod is sometimes called a brake lever fulcrum, hence the name.

FUNNEL. 1. "A vessel for conveying fluids into close vessels; a kind of inverted hollow cone with a pipe; a tunnel."—Webster. See, FILLING FUNNEL.

FURNISHINGS. A term designating the smaller fixtures, hardware, etc., which are usually applied to cars after they shall have left the paint shop. The engravings are very nearly alphabetical in their arrangement and a complete list is given in the index to engravings.

FURNITURE CAR. FIGS. 4, 170-73, 176-79. An extra sized box car. The dimensions given in the engravings are not unusual. More particularly designed for carrying furniture and made extra large.

FURRING. Pieces of wood placed in a wall or other position to nail something to, as a panel or molding. The term is also applied to angle blocks glued or nailed in the inside angle of wood work, where strength and stiffness are required. See, BLOCKING and FURRING BRACE BLOCKS. See, PANEL FURRING.

FURRING BLOCKS. 59b, FIGS. 385-87. See, BLOCKING and above.

FURRING BRACE BLOCKS. Blocks of triangular cross section glued in the angles between the sheathing and furring to give it greater stiffness.

FUSE. A wire strip or bar of fusible metal or alloy placed in series with an electric circuit and designed to fuse and open the circuit when the current exceeds a predetermined value. It performs a function similar to that of a circuit breaker.

FUSE BOX. FIGS. 4877-79. A support for fuses, containing contacts for readily attaching the same, and usually provided with magnetic blowout.

FUSEE. The cone or conical part of a watch or clock, round which is wound the chain or cord. It is a very ancient mechanical contrivance, and is made of a cone form in order to equalize the power of the spring, the leverage of the cord increasing as the resistance of the spring increases and vice versa. See, BERTH SPRING FUSEE.

FUSEE OR FUSE. A tube, casing, rope or ribbon filled or saturated with a slow burning composition, as nitre, sulphur, etc., and used primarily for firing blasts. They are also made to give warnings to approaching trains. They are carried on a train and dropped or placed upon the track at night to warn other trains following that a train has passed that point within a short time before. Trains meeting with a fusee burning on the track are required to stop and wait until it has burned out.

G

GAGE. 1. (Of Track.) The distance in the clear between the heads of the rails of a railroad; 4 ft. 8½ ins. is the standard gage; if greater than this by more than ½ inch, a broad gage; if smaller, a narrow gage. Wide gage usually means a minor and irregular or exceptional enlargement of a given fixed gage, in distinction from tight gage, a corresponding contraction.

2. A tool or instrument used as a standard of measurement of pressure or size. See,

AIR GAGE.
CYLINDRICAL GAGE.
PRESSURE GAGE.
SCREW GAGE.
SCREW PITCH GAGE.
SCREW THREAD GAGE.
WHITWORTH GAGE, etc.

GAGE FOR WORN COUPLERS. In 1899 the Coupler Committee recommended a form of gage to define the contour lines more fully when worn. This gage was adopted as Recommended Practice. See, FIGS. 4705-06.

GAGGER. A CHAPLET, which see.

GAIN. "In architecture, a beveling shoulder, a lapping of timbers, or the cut that is made for receiving a timber."—Webster. In car work the term generally means a notching of one piece of timber into another. Boxing is almost a synonymous term. The timbers are boxed out in order to gain them into each other. A MORTISE, which see, is usually deeper and does not extend clear across the stick.

GALVANIZED IRON. Sheet iron covered with sal ammoniac, after first cleaning it in a bath of dilute acid, coated with zinc by immersing it in bath of the liquid metal. An amalgam of 11.5 zinc and 1 mercury is sometimes used. It is usually made in sheets about 2 feet wide by 6 to 9 feet long, and its thickness measured by its number, wire gage (W. G.). See, KALAMINED IRON.

GANET AIR BRAKE. A system of air brakes for electric and cable cars, in which the air is compressed by a compressor operated from the axle of the car by an eccentric. The apparatus includes (1) an air pump, or compressor, to furnish the compressed air; (2) an eccentric and connecting rod to work the piston of the air compressor; (3) a controlling valve, by which the brakes are applied and released; (4) a jam cylinder, or brake cylinder, to move the brake levers; (5) a main reservoir, and (6) an auxiliary reservoir.

GARNISH RAIL (English). A horizontal piece of ornamental wood curved on the upper surface and placed on the inner side of the mouth of the slot into which the movable window falls. It carries the GLASS STRING ROLLER, which see.

GAS ARM. A GAS WAY TUBE, which see.

GAS BODY (Pintsch Lamp). 451, FIGS. 2605-21.

GAS BROILER AND UTENSILS. FIGS. 2744-48. A small cook stove heated by Pintsch gas for use on parlor and sleeping cars in preparing light meals.

GAS BURNER. FIGS. 2519-25. "The jet piece of a gas lighting apparatus, at which the gas issues and combustion takes place."—Knight. A system of gas burning has been in use on the Pennsylvania Railroad by compressing ordinary city gas. Another and more elaborate system is the PINTSCH, which see, FIGS. 2466-2621. Acetylene gas is now being successfully employed in train lighting.

GAS LAMPS. See, PINTSCH LAMPS.

GAS NIPPLE (Pintsch Lamp). 453, FIGS. 2605-21.

GAS NIPPLE COVER (Pintsch Lamp). 454, FIGS. 2605-21.

GAS PIPE. See, PIPE.

GAS PIPE FITTINGS. FIGS. 2477-95. See, PIPE FITTINGS.

GAS WAY (Pintsch Lamp). 327, FIGS. 2605-21.

GAS WAY TUBE (Pintsch Lamp). 309, FIGS. 2605-21.

GATE. 1. See, PLATFORM GATE.

2. (Of a Casting Mold.) The opening through which the melted metal is poured. Also called ingate.

GAUZE. See, WIRE GAUZE.

GEAR. 1. In mechanics the term is used to designate a combination of appliances for effecting some result, as valve gear. See, BRAKE GEAR. DRAW GEAR. SWING MOTION GEAR.

2. Wheels are said to be in gear when they have cogs interlocking.

GEAR WHEEL. 5, FIGS. 4722-27. Any cogged wheel is a gear wheel, but the term is usually restricted to the larger one of two cog wheels in gear, the lesser one being called the pinion. The gear wheel is also called a spur wheel.

GELATINIZED FIBER. Another name for VULCANIZED FIBER, which see.

"GEM" DOOR SPRING. FIG. 2146. See, DOOR SPRING.

GENERAL ELECTRIC COMPANY'S ELECTRIC MOTOR (For Street Cars). FIGS. 4774-82.

GENERATOR (Gould Electric Light). FIGS. 2637-40. See, DYNAMO.

GENERATOR COILS (Heaters, Baker's, Gold's, etc.). FIGS. 2189, 2214, 2226-27. Wrought iron pipe coiled into a variety of spiralic shapes, as shown in the figures, and put into the fire pot of a heater, to heat the water they contain and create a circulation through the hot water pipes of the car. Among the different types is the expanding generator coil, FIGS. 2226-27, in which the diameter of the pipe increases as the heated water ascends in it.

GIB (for Journal Bearings). A JOURNAL BEARING KEY, which see.

GIB AND KEY. A fastening to connect a bar and strap together by a slot common to both, in which an E-shaped gib with a beveled back is first inserted and then driven fast by a taper key.

GIBSON FASTENING. FIG. 4225. One of the earliest applications of the principle of securing a tire to a wheel by means of clips instead of bolts, studs or rivets.

GILMAN-BROWN EMERGENCY KNUCKLE. FIG. 1396. A knuckle designed to be used in cases where loss or breakage of the lock or knuckle would cause delay. The knuckle has a long tail, which projects back through the head and bears against the walls of the shank. It may be inserted for temporary use in almost any make of coupler.

GIMLET POINTED SCREW. The common WOOD SCREW, which see, of carpentry and joiner work, having its screw cut to a point like a gimlet, so that it can force its own way into wood.

GIRDER. "In architecture, the principal piece of timber in a floor. Its ends are usually framed into the summers, or breast summers, and the joists are framed into it at one end. In buildings entirely of timber the girder is fastened by tenons into the posts."—Webster.

"The term girder is restricted to beams subject to transverse strain, and exerting a vertical pressure merely on their points of support."—Stoney. The term is almost synonymous with truss. Thus, engineers speak of a "Howe truss," a "Pratt truss," a "Warren girder" and a "lattice girder." The distinction is that a truss consists of separate parts held together by pins, or even simply by pressure, which may be taken down and re-erected; whereas a girder is a single solid structure, either all one solid piece (rolled girder) or of plates riveted together (plate girder), or of combined plates and riveted lattice work (lattice girder).

GIRTH. 49, FIGS. 159-69, 185-95. A belt rail. A long horizontal piece of wood on the side of a box car body fitted to the posts and braces so as to embrace them, placed about half way between the floor and the roof. The end girth is a similar stick across the end of the car. The inside lining reaches up to the girth.

GIRTH TIE ROD. A BELT RAIL TIE ROD, which see. A horizontal rod extending from the door to the corner post along the girth of a freight car and intended to tie the two posts together.

GLAND. A cover of a stuffing box, as for a piston rod, etc. See, PISTON ROD PACKING GLAND.

GLASS. See, WINDOW GLASS. CUT GLASS. SAND BLAST.

GLASS STRING, OR GLASS STRAP (English). A leather strap by which the window in the door of a carriage is raised or lowered. The strap is pierced with a number of holes, which fit a small brass or ivory knob placed on the door immediately under the GLASS STRING ROLLER, which see.

GLASS STRING ROLLER (English). In a carriage, an ornamental roller attached to the upper edge of the garnish rail in a door. The leather strap (glass string) by which the window is raised and lowered passes over this roller.

GLASS WATER GAGE. A gage consisting essentially of a vertical glass tube connected at top and bottom with a boiler so as to make the height of water therein visible.

GLOBE (of Pintsch Gas Lamp). FIG. 2549, etc. A globe of hemispherical form, admitting air only from the top. It is an almost universal type of car lamp globe in Europe.

A glass bowl. See,

ADJUSTABLE GLOBE. LAMP GLOBE.
FAST LAMP GLOBE. LOOSE GLOBE.

GLOBE CHIMNEY. FIGS. 2678-86. A LAMP GLOBE CHIMNEY, which see.

GLOBE FINGER (Pintsch Lamp). 452, FIGS. 2605-21.

GLOBE HOLDER. 7, FIGS. 2694-2710. Any contrivance for holding a globe on a lamp. Usually it consists of a metal ring at the base of the globe, on which the latter rests, and to which it is fastened with springs, screws, or by the pressure of the globe chimney on top, when the latter is adjustable. See, ADJUSTABLE and DETACHABLE GLOBE HOLDER.

"GLOBE" VENTILATOR. FIGS. 3494-95. A ventilator of spherical form, with annular openings which produce an induced exhaust current in whatever direction a current of air strikes against it. They are made erect and horizontal.

GLUE. A preparation from the hoofs, horns and hides of animals, washed in lime water, boiled, skimmed, strained, evaporated, cooled in molds, cut into slices and dried upon nets. If good, it is a hard cake, of a dark but almost transparent color, free from black or cloudy spots and with little or no smell. The more transparent and amber colored the better. Inferior glue made from bones will almost entirely dissolve in cold water; other kinds are contaminated with lime. Glue is better for remelting. The strength of glue for common work is increased by adding a little common chalk.

GLUE SIZE. One pound of glue in a gallon of water. Double size has about twice this quantity of glue. Patent size is a kind of gelatine.

GOLD'S SYSTEM OF CAR HEATING. FIGS. 2325-94. Several systems of car heating, designated as the plain pipe or direct steam system; direct steam terra cotta storage system; double coil sealed jet accelerator system.

GOLD'S UNIVERSAL STRAIGHT PORT STEAM COUPLING. FIGS. 2329-32. A steam hose coupling somewhat resembling the Sewall coupling.

The coupling is effected by locking arms or lugs, which project beyond the end of the body and engage with the projecting rollers and stud on the opposite side during the act of coupling. To couple, the heads are brought together so that the locking projections on either side engage with one another; then the bodies are tilted downward, bringing the seats together.

To insure the bodies locking firmly together a spindle or stud is cast on the side of each body, and a roller is placed over the stud, so that when lugs of coupling bodies engage with the rollers they turn on the studs and the friction is reduced to a minimum.

The seat is made of an asbestos composition, formed externally as a segment of a sphere, and mounted in a tubular metal thimble or ring, which is made with two opposite guide fingers projecting inwardly and engage with the base of the socket in coupling head. This limits the movement of the seats.

This coupling interchanges with the Sewall.

GONDOLA CAR. FIGS. 21-46, 239-286. A car with sides, but without a top covering, for the transportation of freight in bulk. They are sometimes distinguished as high side and low side, drop bottom and hopper bottom. Cars with inclined floors and entirely self clearing are more properly called HOPPER CARS, which see. Gondola cars are sometimes made with drop ends for loading lumber.

GONG. A SIGNAL BELL, which see.

GOODS WAGON (English). American equivalent, freight car.

GOODWIN CAR. FIGS. 322-24. An automatic dumping car, operated by compressed air from the engine. The aprons are so arranged that the load may be dumped fast or slow and over any part of the track. They are rapidly coming into use for the transportation of all manner of bulk freight, ballast, ore, billets, rock, coal, etc.

GOULD BUFFER AND PLATFORM. FIGS. 1699-1705. A platform, draft gear and buffer for passenger cars using a three stem buffer. Largely used on the Vanderbilt lines.

GOULD CAR COUPLER (Freight). FIGS. 1409-10. (Passenger). FIGS. 1500-01.

GOULD DUMMY VESTIBULE AND DRAFT GEAR. FIGS. 1704-05. A modification of the vestibule for passenger cars to suit blind end baggage and express cars. The buffer springs are placed back of the end sill of the car, no platform end sill being used.

GOULD ELECTRIC CAR LIGHTING APPARATUS. FIGS. 2622-40. A system of car lighting from electricity generated by a dynamo connected by a belt to the axle. The details of the apparatus and plans of wiring and connection are shown in the figures. The dynamo, FIGS. 2637-40, has connected to it an automatic governor switch which throws the current into the system when the predetermined speed is reached and which controls the voltage output as the speed increases. When the lights are not turned on and the car running, the current generated is used to charge the storage batteries, from which current is taken when the car is at rest. The current is deflected from the lamps or batteries without noticeable flickering. The whole system is controlled automatically and requires little attention. See, AXLE LIGHT.

GOULD JOURNAL BOX. FIG. 4111.

GOULD PLATFORM. See, GOULD BUFFER AND PLATFORM.

GOULD SPRING BUFFER. FIG. 1711. A yielding buffer block attached to the end sill of freight cars.

GOVERNOR (Air Brake). FIGS. 947-50. See, PUMP GOVERNOR.

GRAB IRONS. 60, FIGS. 159-69, etc. Also termed corner handles, or ladder handles, and hand holds. The handles attached to freight cars for the use of trainmen in boarding the cars. They are often more definitely specified as roof, side or end grab iron.

For Standard of M. C. B. Association with regard to hand holds or grab irons see, HAND HOLDS.

The grab irons or hand holds shown in FIGS. 4444-67 are in the positions recommended.

The term handle, though often used to designate these attachments, is not strictly appropriate to such a part, nor is it so widely in use as grab iron. Similar parts on passenger cars are called HAND RAILS, which see.

GRADUATED SPRING. A form of compound spring in which only a certain number of the individual spirals come into action with a light load and the others only under a heavy load. Another method of accomplishing the same end, graduating the resistance of the spring to the load placed upon it, is the use of the keg shaped or spool shaped spring. Under a load the part of larger diameter closes first and that of smaller diameter is much stiffer. Graduated springs have formerly been constructed by combining rubber and spiral springs, but they are now out of use. Graduated springs have been superseded by single and double nest coil, of equal length, and few, if any, are being applied to new construction.

GRADUATING SPRING. 22, FIG. 910 and 9, FIG. 913. (Triple Valve). A spiral spring which acts against a collar on the graduating stem to hold the latter against the triple valve piston when it is forced downward.

GRADUATING STEM (Triple Valve). 21, FIGS. 910 and 8, FIG. 913. A slender rod or pin which works in a hole drilled in the center of the triple valve piston, and which, by the movement of the latter, opens and closes communication from the chambers above and below the piston.

GRADUATING STEM NUT (Triple Valve). 20, FIG. 910 and 10, FIG. 913.

GRADUATING VALVE (Car Heating). FIGS. 2295, 2417-18. A valve constructed so as to open slowly and designed to give better regulation of the temperature of the car after a car is heated. This is accomplished by attach-

ing a movable piston to the valve stem, which has a loose fit in an inwardly projecting ledge cast with the valve case. As the valve opens the piston exposes V-shaped notches above this ledge through which steam passes up under the valve seat in its course to the heating apparatus, opening the valve wider, exposing more of the V-shaped ports and increasing the flow of steam. When the valve is closed the steam is entirely shut off by means of the valve disc and seat attached to the same stem.

GRADUATING VALVE. 1. (Triple Valves.) 7, FIGS. 910, 913 and 48, FIGS. 959-62, 966. See above and TRIPLE VALVE.

2. (Engineer's Valve.) 110-112, FIGS. 968-71.

GRADUATING VALVE SPRING (Triple Valve). 49, FIGS. 959-62, 966.

GRAHAM DRAFT RIGGING OR GEAR. A draft rigging that has been in much favor which employs a tail bolt instead of a yoke strap. It has two check castings which engage in the draft sills and draft timbers, and in these two thimbles or drawbar followers fit, through which the tail bolt passes. These, with two follower plate straps, one carry iron, three strap plates, the chafing plates and filling pieces between center sills, constitute the attachments.

GRAIN CAR. A box car with tight inside grain doors. Nearly all box cars are provided with them.

GRAIN DOOR. FIGS. 1073-1141. A close fitting movable door on the inside of a box car by which the lower part of the door opening is closed when the car is loaded with grain, to prevent the latter from leaking out. Such doors are usually made so that they can be thrown over on one side of the doorway or suspended from the roof, and thus be out of the way when they are not used.

GRAIN DOOR FLAP. The upper part of a grain door. Hinged horizontally with the door proper.

GRAIN DOOR ROD. K, FIGS. 1087-1106. An iron rod attached to the door posts on the inside of a box car, to which a grain door is fastened or hinged. The door and rod are generally arranged so that the former can be moved to one side and out of the way when the car is not loaded with grain. In other styles the door slides upon the rod to the roof and is there suspended.

GRATE (Baker Heater). FIG. 2195. A frame of iron bars for holding coals in a stove, fire place, etc. It is usually capable of a sliding or rocking motion, or both, to clear away ashes and clinkers. See, ANTI-CLINKER GRATE. SAFETY GRATE.

GRATED DOOR. 61, FIGS. 208-11. A door consisting of a wooden frame with iron or wooden bars, used on cars for carrying fruit, live stock, etc.

GRATE SHAKER (Baker Heater). FIG. 2194. An iron bar which can be attached to a grate to move it in shaking the fire.

GRATE SUPPORT (Baker Heater). FIGS. 2196, etc. A crowfoot shaped bracket, fastened to the sides of the ash pit to carry the fire grate.

GRATING. See,

CLINKER GRATING.
ICE BOX GRATING (Refrigerator Cars).
VENTILATOR GRATING (Fruit Car).
WINDOW GRATING.

GRAVEL CAR. A car for carrying gravel; usually either a tip car or a flat car, the latter most used. They are often fitted with a central rail, over which a ballast plow, drawn by the locomotive after detaching it from the cars, works to unload the cars. Sometimes a hoisting plant is mounted upon one of the cars, for moving the plow.

GRAVITY RELIEF TRAP (Gold's Car Heating). FIGS. 2339-47. An auxiliary trap, automatic in its action, which is closed by the escape of steam and held closed by the steam pressure. When the pressure is removed the weight of the valve stem tips the valve and allows the escape of the water of condensation. The pressure under which it closes is dependent on the weight of the valve stem.

GREASE AXLE BOX (English). An axle box which is lubricated from above by a grease composed of tallow, soda, and water, which is solid at ordinary temperatures and melts should the box get warm. This form is being superseded by the OIL AXLE BOX, which see.

GREASE BOX. A JOURNAL BOX, which see.

GREASE CHAMBER (English). A cavity above the journal bearing which contains the lubricating material in a GREASE AXLE BOX, which see.

GRIFFIN CHILLED CAST IRON CAR WHEELS. FIGS. 4217-20.

GRILLE (Interior Decoration). FIGS. 2911-28. Generally a piece of wrought work in wood or metal for decoration. Used in the place of panels, over doorways and in bulkheads and sometimes employed as brackets, as at G, FIG. 1781.

GROMMET. FIGS. 2168-69. "A ring formed with spliced rope (Nautical)." The separate parts of any metallic eyelet are known as grommets. The two grommets, when compressed together (with a setting die), form the eyelet.

GROUND GLASS. Glass whose surface has been roughened by mechanical or chemical process so as to break up the light passing through it and destroy its transparency. Several processes exist: by the wheel, sand blast, rotating with pebbles, or by fluoric acid. The sand blast is at present most commonly used.

GROUP SPRING. A spiral car spring formed of a number of separate springs, single or nested, united together by a common pair of spring plates. It is called a double, or two group, a three group, four group spring, etc., according to the number of separate springs.

GUARD. 1. See,

DASH GUARD.
DOOR GUARD.
DRAW TIMBER GUARD.
DUST GUARD.
FENDER GUARD.
HEAT GUARD.
MIRROR GUARD.
LINING GUARD.
WINDOW GUARD.

2. (English.) American equivalent, conductor. A railway official traveling with and having charge of a railway train. He unites the functions of a conductor, baggage master, express agent, and brakeman, but seldom collects or nips tickets, and never issues them or receives fares. An assistant guard is sometimes, but not always, carried.

3. (For Lanterns.) The exterior wire cover surrounding the globe and protecting it from accident. They are termed either single, double, or triple guard, according to the number of horizontal wires.

GUARD LINING STRIPS Horizontal bars or strips which are placed in a car to keep freight from a door, ice box, ventilator, etc. When placed vertically, as they usually are, they are termed guard posts.

GUARD POSTS (Fruit Car). A row of posts standing inside of the ventilators and serving as a fender for the load packed within so as to prevent obstruction to the ventilators.

GUARD RAIL AND FROG WING GAGE. FIG. 4369. The guard rail and frog wing gage shown were adopted as standard in 1894, to define the dimensions of track to which M. C. B. standard wheel and flange gages have been made to conform.

GUARD'S VAN (English). American equivalent, caboose or baggage car. See, BRAKE VAN.

GUDGEON. The bearing portion of a shaft, especially an upright wooden shaft. A rude journal bearing for slow motion. See, SCREW COUPLING NUT AND GUDGEON.

GUIDE. "That which leads or conducts."—Webster. See,

BELL CORD GUIDE.
BELL STRAP GUIDE.
BRAKE LEVER GUIDE.
DRAWBAR GUIDE.
GLASS PLATE GUIDE.
JOURNAL BOX GUIDE.

BRAKE ROD GUIDE. STOP BAR GUIDE.
DEAD LEVER GUIDE. STRAP HANGER GUIDE.

GUIDE BAR. 1. See, TRUCK BOLSTER GUIDE BAR OR COLUMN, 37, FIGS. 3735-3951.

GUIDE BLOCK. See, TRUCK BOLSTER GUIDE BLOCK.

GUIDE CASTING. 27, FIGS. 3151-52. A strip or plate of metal screwed to the wall or arm rest of a seat for the striker arms to rub against to save the wood. Called also a FRICTION PLATE, which see (FIGS. 3169-91).

GUIDE RAIL. A DOOR TRACK, which see.

GUN SHAPED LAMP CHIMNEY. FIG. 2685. See, LAMP CHIMNEY.

GURRING PIECE (Snow Plow). Probably from gurr, a fort, hence a piece built out to protect or fortify a structure. In a snow plow, timbers bolted to the posts to build out and give shape to the sides.

GUSSET PLATE. 192, FIGS. 159-69, 271-95, etc. A flat plate used to rivet two parts of a metal underframe together by riveting through each member and the plate.

GUY. A rope used as a stay.

GUY RINGS (of a Derrick or Crane). Rings attached to the head block at the top of the mast to which guy ropes may be attached.

H

HAIR. See, CURLED HAIR.

HAIR FELT (Refrigerator Car). D, FIGS. 185-95. A heavy non-conductor of heat made of hair placed between the inner and outer linings to prevent absorption of heat.

HALE AND KILBURN CAR SEATS AND UPHOLSTERY. FIGS. 3142-72, 3226-44.

HALF ELLIPTIC SPRING. See, SPRING. ELLIPTIC SPRING.

HAMMER OF A PILE DRIVER CAR. The heavy weight (4,000 to 4,500 lbs.) by which piles are driven. It falls between the leaders and is provided with a hammer eye or clevis, to which the shears of the hoisting rope or hammer rope are attached. In England called a tup.

HAMMOCK (Sleeping Car Berth). 52, FIGS. 1778-83. A light small hammock of twine, in which to put wearing apparel in a sleeping car berth. One is furnished to each berth.

HAND CAR. FIGS. 4714-28. A small and light car arranged with cranks or levers and gearing so that it can be propelled by hand by persons riding on the car. One of these cars is provided for each section of 3 to 6 miles of track. Hand cars for regular section service weigh from 450 to 600 lbs., generally about 500 lbs.

HAND CAR LEVER, OR PROPELLING LEVER. 19, FIGS. 4722-27.

HAND CAR TRUSS ROD. 26, FIGS. 4722-27. A transverse or longitudinal rod by which the floor frame of a hand car is trussed.

HAND CAR WHEEL. A light wheel for hand cars, with cast iron rim and hub and wrought iron spokes, or sometimes with a wooden center.

HAND HOLDS (M. C. B. Standards). FIGS. 4444-67. See, PROTECTION OF TRAINMEN. The standards for hand holds are as follows:

Box and stock cars constructed with projecting end sills, with end ladders, should be provided with a longitudinal grab iron or hand hold about 24 inches long on side of car over each step, located not less than 18 inches nor over 30 inches above center line of drawbar. The end ladder should be located on left hand side of end of car, and one horizontal grab iron or hand hold, about 24 inches long, on right hand side of end of car not less than 18 inches nor over 30 inches above center line of drawbar, the lower rung of ladder being a suitable grab iron for opposite side of end of car, as shown.

Box and stock cars constructed with projecting end sills with side ladders located over steps, the lower rung of such ladders is an effective grab. They should also be provided with two horizontal end grab irons or hand holds, about 24 inches long, located on each side of end of car not less than 18 inches nor over 30 inches above the center line of drawbar, as shown.

Box and stock cars not constructed with projecting end sills, and which have end ladders, should be provided with horizontal grab iron or hand hold about 24 inches long on side of car over each step, located not less than 18 inches nor over 30 inches above center line of drawbar. The end ladder should be located on left hand side of end of car, and one horizontal grab iron or hand hold about 24 inches long on right hand side of end of car not less than 18 inches nor over 30 inches above center line of drawbar, the lower rung of ladder being a suitable grab for that side of end of car, as shown. End ladders constructed without side frames should have the lower rung provided with a guard to prevent the foot from slipping off.

On box and stock cars not constructed with projecting end sills, and which have side ladders located over steps, the lower rung of such ladder is an effective grab. They should be provided with two horizontal end grab irons or hand holds about 24 inches long, located on right hand side of end of car not less than 18 inches nor over 30 inches above center line of drawbar, as shown.

All gondolas with drop ends to be provided with horizontal grab irons or hand holds on sides of car over each step, about 24 inches long, located as high as possible, but not less than 18 inches nor over 30 inches above center line of drawbar, and two grab irons or hand holds placed under the sill at end of car as near the face as will insure a good safe fastening, the outside end of it to be in line with the inside face of the side sill, and to be about 18 inches long with a space not less than 3 inches between it and the end sill, as shown. If preferred, the end hand holds may be placed on the face of the end sill, as shown in the alternate illustration.

All high-side, fixed-end gondolas should be equipped with a vertical grab iron or hand hold over steps on the sides of the car, about 24 inches long, the lower end to be placed about 6 inches above the floor of the car, and two horizontal grab irons or hand holds on each end of car, about 24 inches long, 4 inches from the outside of car and not less than 18 inches nor over 30 inches above center line of drawbar; exception to be made where the car is provided with a brake step, in which case the bracket of the brake step can be used as a grab iron on that side of end of car, as shown, for low sides. It is also recommended that where the side of a gondola car is too high for a man standing on the step to reach the top, there should be two additional vertical grab irons or hand holds placed on each side of end of car, extending from within 4 inches of the top, to be about 18 inches long, as shown for high sides.

Tank cars should be provided with horizontal grab irons or hand holds, about 24 inches long, on sides over steps; but cars provided with safety railings on sides do not require side grab irons or hand holds, but should be provided with two end grab irons or hand holds, about 18 inches long, located on under side of end sill, the same as for drop-end gondolas, and as shown. If preferred, the end hand holds may be placed on the face of the end sill, as shown in the alternate illustration.

All flat cars to be provided with horizontal grab irons or hand holds on sides of cars over steps, about 24 inches long, and if not equipped with step, one grab iron or hand hold on each side near end of car, where coupler unlocking rod is located, and two end grab irons or hand holds, about 18 inches long, placed under the sill as near the face as will insure a good safe fastening, the same as for drop-end gondolas, and as shown. If

preferred, the end hand holds may be placed on the face of the end sill, as shown in the alternate illustration.

It is also recommended that all grab irons or hand holds shall be secured by through bolts of ½-inch diameter, with nuts on the outside and riveted over wherever it is possible to do so, and where lag screws are used they shall be not less than ½ inch diameter and 3 inches long, and screwed into solid wood.

Hand holds on end sills should have at least 2 inches clearance behind them, and all other hand holds should have at least 2½ inches clearance behind them.

All hand holds should be made of iron not less than ⅝ inch diameter; hand holds on sides and ends of cars should be about 24 inches long in the clear; those on end sills to be made shorter only when it is impossible to use this length.

See, Proceedings 1879, pages 109, 110 and 111; Proceedings 1893; Proceedings 1894; Proceedings 1896; Proceedings 1902.

HAND HOLE. See, DUST HAND HOLE.

HAND POLE (Street Cars). A pole carried on hand pole brackets bolted to the deck sill, on which pole are hung hand pole straps for people who are required to stand to cling to. See, POLE STRAPS.

HAND RAIL. 1. A bar or rail to take hold of with the hand, as the body hand rail of passenger car platforms, door hand rail, inside hand rail and step hand rail of street cars, and roof hand rail or brake hand rail of box and stock cars.

2. (Tank Cars.) 121, FIGS. 325-37. An iron pipe supported on hand rail posts on the outside of the running board, for trainmen to hold on to in passing over cars.

HAND RAIL BRACE (Freight Car Roofs). See, ROOF HAND RAIL.

HAND RAIL BRACKET (Postal Cars). FIGS. 2888-89. See also, INSIDE HAND RAIL BRACKET (Street Cars).

HAND RAIL POST (Tank Car). 122, FIGS. 325-37.

HAND STRAPS (Street and Suburban Cars). FIGS. 2907-10. Straps attached to the inside handrail for passengers to hold on by. Generally made in the form of a double loop.

HAND WHEEL. A BRAKE WHEEL, which see.

HANDLE. "That part of anything by which it is held in the hand. A haft. As the handle of a knife or other instrument."—Worcester. They are designated by the name of the part or thing to which they are a handle, as ash pit door handle, etc.

HANDLE BOLT (Engineer's Valve). 9, FIGS. 907-909.

HANDLE SPRING (Engineer's Brake Valve). 10, FIGS. 907-909, and 69, FIGS. 968-71. A spring carrying a dog to hold the handle in any desired position.

HANGER. 1. "That by which a thing is suspended."—Webster.

2. "A means for supporting shafting of machinery."—Knight. See,

BELL CORD HANGER.
BERTH CURTAIN ROD HANGER.
BRAKE BEAM ADJUSTING HANGER.
BRAKE HANGER.
DOOR HANGER.
LINK HANGER.
PARALLEL BRAKE HANGER.
PUSH ROD HANGER.
ROCKER BEARING TIMBER HANGER.
SAFETY HANGER.
SPRING HANGER.
STEP HANGER.
STRAP HANGER.
SWING HANGER.
SWING LINK HANGER.
T HANGER.

HANGER LINK. A SWING HANGER, which see.

HANGING BOARDS, OR MEAT TIMBERS (Refrigerator Car). Transverse bars, resting usually on bogus plates, to which the load of meat is suspended.

HANGING DOOR SHEAVE. FIGS. 2153-60. See, CAR DOOR HANGER.

HARD HAIR. A quality of curled hair which is very stiff or rigid. See, CURLED HAIR.

HARRISON DUST GUARD. FIG. 4090.

HART DECK SASH PIVOT AND RATCHET CATCH. A device for regulating the opening of deck sashes, the special feature of which is the undulating rack, enabling the sash to be easily moved by the hands and yet holding it fixed when released in any one of several different positions.

HARTLEY PARLOR CAR CHAIR. One of the varieties of adjustable chairs for railroad use. In its complete form it has three separate adjustments of the foot rest, the back and the head rest. A rear foot rest is also sometimes attached for the benefit of the occupant of the chair in the rear. The adjustments are controlled by a thumb lever, chair back latch and adjusting lever.

HARTSHORN SHADE ROLLER. FIG. 3724. See, SHADE ROLLER. An ingenious device to hold window shades at any desired point by means of centrifugal pawls which fly out and do not check the revolution of the roller while in rapid motion, but engage with and hold it at any point otherwise. The McKay shade roller is somewhat similar, but uses a cam instead of a pawl.

HASP. The bar which fits over a staple and is fastened thereon by passing the shackle of a padlock through the staple, or by a pin. The other end of the hasp is attached by a pin or another staple to the door. See, DOOR HASP. HEAD BOARD COUPLING HASP. SHACKLE.

HASKELL TRUCK. FIGS. 3730, 3768-73. A modified form of arch bar truck using pressed steel forms for the members of the side frame.

HAT HOOK. FIGS. 2929-50, etc. A metal hook for hanging hats on.

HAT POST. FIGS. 2929-50, etc. An upright metal pin for hanging hats on. These are used chiefly in sleeping and parlor cars, and they are invariably combined with a hook and technically called hat post and hook.

HAT RACK. A BASKET RACK, which see.

HAY CAR. A box car for carrying baled hay; usually made with larger bodies and doors than ordinary box freight cars.

HEAD. See,

CYLINDER HEAD.
BRAKE HEAD.
BUFFER HEAD.
CROSS HEAD.
DOME HEAD.
DRAW HEAD.
DRAWBAR HEAD.
PISTON HEAD.
TANK HEAD.

HEAD BLOCK. 1. (Of a Derrick or Crane.) The casting carried at the top of the mast to which the boom shoe rods, tension rods and guy rings, etc., are attached. It usually revolves upon a head block pin.

2. (Of a Switch.) The long timber to which the switch stand or its equivalent is fastened, and on which the ends of the switch rails bear.

HEAD BOARD. 9, FIGS. 1778-83. A light partition which separates one berth in a sleeping car from that next to it. It is stowed away by day in the pocket between the upper berth, when closed up, and the roof. It is secured in place at the back and front by head board bolts entering at the back into a bushing, fixed to the top of the stationary seat back and along the upper inside edge by a head board coupling, entering into a head board coupling keeper. The head board bolt for the front corner of the head board is of peculiar construction, designed to avoid all interruption of a flush surface by day, while still giving a secure attachment.

HEAD BOARD BOLT. FIGS. 3389, 3411, etc.; 54, FIGS. 1778-83. See above.

HEAD BOARD BOLT BUSHING. FIGS. 3402-06. See above.

HEAD BOARD COUPLING. FIGS. 3407-08. A metal hasp and keeper by which a head board is fastened to the side of the car.

HEAD BOARD COUPLING HASP. See above.

HEAD BOARD COUPLING KEEPER. FIG. 3408. See above.

HEAD BOARD FASTENER. FIGS. 3409-10.

HEAD BOARD LUG. Serves same purpose as a BUSHING, which see.

HEAD BOARD POCKET. 32, FIGS. 1778-80. A pocket which closes up flush with the head board surface, but opens at night, by releasing a head board rack catch so as to afford a receptacle for clothing or parcels. This form of head board pocket has been superseded by a pocket made by folding up the upholstered head rest, as shown in FIG. 1780, 32.

HEAD LINING. A painted canvas or prepared lining with which the ceilings of passenger cars are covered. The painting on head linings is intended to be of an ornamental character. When of wood the head lining is called ceiling. The duck for head lining comes in any width up to 12 feet. Head lining is sometimes cut up into panels, but a paneled ceiling is usually understood to be a wood ceiling, which is largely supplanting canvas head linings.

HEAD LINING NAIL. A nail with a large button shaped head especially made for fastening head linings to the ceilings of cars.

HEAD PIECE (Street Cars). A body end plate.

HEAD REST. 32, FIGS. 1778-83. In a first class carriage and sleeping cars a fixed vertical projection from the back of the seat, thickly padded with horse hair and covered with broadcloth or leather. It serves to support the side or back of the head of a passenger. That at the end of the seat is a head rest, but it is also called a seat head end or end head rest, 14, FIGS. 1778-83.

HEAD ROLL (of a Seat). FIGS. 3154-56. A padded projection at the top of a seat or chair back, which is to support the head. It is cylindrical and extends full width of the seat.

HEADSTOCK (English). American equivalent, end sill. The transverse end member of the UNDERFRAME, which see. It is pierced transversely in the center for the draw-gear, and the buffing gear is carried near the ends.

HEADSTOCK AND DIAGONAL KNEE (English). A wrought iron knee connecting the headstock to the diagonal and the sole bar, and thus binding three of the four main members of the underframe together.

HEADSTOCK CAP (English). A cast iron cap fitting the end of the headstock in order to prevent its splitting, and to prevent any access of water to the end grain of the wood. A wrought iron strap is sometimes used.

HEAT AND LIGHT TENDER. A special car coupled in a train carrying a steam generating plant by which the cars are heated, and an electric light plant for lighting the train.

HEAT GUARD. A sheet metal covering for the woodwork of a passenger car, to protect it from the heat of a stove. It is nailed to the side and ends of the car, and sometimes surrounds the stove, as the conical Russia iron heat guard of the Baker heater.

HEATER. 1. FIGS. 2180, etc. Any apparatus for warming a car, room, or building by convection; that is, by conveying hot water, steam, or warmed air into or through the apartments. The term generally refers to any arrangement for warming apartments other than stoves, which heat by direct radiation. There have been many varieties in use, but the one remaining and which has the field practically to itself is the Baker heater. There are numerous heating systems, but they, for the most part, use Baker heaters in connection with their apparatus. Nearly all the systems use heaters which circulate hot water. They are usually placed in a small closet called the HEATER ROOM, which see. In emigrant cars cook stoves are used for heating.

2. (For Lamps or Lanterns.) A metallic attachment passing around and above the flame or otherwise immediately adjacent to it, by which heat is conveyed to the oil in the reservoir below, to prevent freezing, or, in some cases, to assist combustion by heating or volatilizing the oil.

HEATER CAR. One constructed for the carrying of fruits, vegetables, and other perishable products in winter. They are heated by special forms of mineral oil lamps, the supply to which is automatically controlled by the expansion and contraction of metallic rods. They are principally in use for the transportation of potatoes and other vegetables.

HEATER ROOM. A small closet, cased with sheet metal interior heat guards, to contain the heater and prevent all direct radiation. All heaters proper are placed in some equivalent for such rooms.

HEATER PIPE CASING. Q, FIG. 1781. A wooden or iron shelf over a heater pipe in a passenger car to prevent the feet of passengers from coming in contact with the hot pipes. The casing also forms a foot rest.

HEIGHT OF COUPLERS. The standard height of couplers for passenger equipment cars is 35 inches from top of rail when car is light. Adopted in 1890; see, Proceedings 1890 and 1893.

The standard height of couplers for freight cars, measured perpendicular from the level of the tops of rails to center of couplers, adopted in 1893, is 34½ inches, with no greater variation allowable than 3 inches, minimum height 31½ inches. By center of coupler is meant the horizontal line through the center of the coupler shank. See, Proceedings 1872, pages 42, 43 and 46; Proceedings 1879, pages 108 and 109; Proceedings 1884, page 30; Proceedings 1896.

HELPER. A term used to designate either an assistant engine for trains, or a horse to help street cars up grades.

HERRON REINFORCED INSERT SHOE. FIGS. 1010 and 1017. A brake shoe with cast iron body and special metal inserts. The feature of this shoe is the placing of a strip of wrought iron immediately back of the inserts to bind the shoe together.

HEYWOOD BROS. & WAKEFIELD CAR SEATS. FIGS. 3173-81.

HIEN FRICTION DRAFT GEAR. FIGS. 1217-34.

HIEN COUPLER. (Freight), FIGS. 1434-40; (Passenger), FIGS. 1503-04.

HIGH BACK SEAT. FIGS. 3154-56, etc. A class of seats with extra high back and frequently a head roll or head rest.

HIGH SIDED WAGON (English). A four wheeled gondola car, with sides about 4 feet high. Used chiefly for bulky freight, wheat, potatoes, sacks and bales. See, WAGON.

HIGH SPEED BRAKE (Westinghouse). FIGS. 897, 952-57. Brake attachments essentially the same as the ordinary quick acting brake, with a pressure reducing valve, FIGS. 952-56. The reservoir pressure is increased from 90 lbs. to 110 lbs. by means of the duplex pump governor, FIGS. 949-50, and on emergency applications an excessive pressure of 90 lbs. is admitted to the brake cylinder. This high pressure is slowly bled off through the reducing valve to 60 lbs. when subsequent operations of release and recharging take place, as in the ordinary quick acting brake. For cars not equipped with reducing valves a safety valve, FIG. 951, is required.

HINGE. FIGS. 1942-72. "A hook or joint on which a door, gate, etc., turns"—Webster. They are provided with a tube like knuckle through which the HINGE PIN, which see, passes. See,

BALL BEARING BUTT HINGE.	MAN HOLE HINGE.
DOOR HINGE.	SEAT HINGE.
DOUBLE ACTING HINGE.	SOFA HINGE.
DROP DOOR HINGE.	STOP BAR HINGE.

The common door hinge is usually a butt or butt hinge, the varieties of which are the acorn butt, a large ornamental hinge, BLAKE BUTT, which see, and the hopper butt, so called from its pointed form. The parliament hinge is a sort of T-shaped butt hinge to afford more room for screws. It is little used except for ornamental purposes. The strap hinge is a common form of rough hinge for heavy doors, but it is sometimes

made very elaborate and ornamental, FIGS. 1958-59. A T-hinge is a combination of the butt and strap hinge, one-half being of each form. Butt hinges are either fast joint, loose joint or loose pin. A double acting hinge is one which permits the door to swing either way.

HINGE PIN. FIGS. 1944, 1954, etc. The pin passing through the knuckle of a hinge and holding the two parts together. A loose joint butt hinge has the pin fast in the lower half of the knuckle and projecting upward, so that the other half is held on only by gravity. The hinge pin in the best hinges screws into the knuckle.

HINGE PLATE WASHER (English). A long wrought iron washer taking all the bolts securing the main part of the hinge to the door.

HINKLEY BRAKE SLACK ADJUSTER. A device consisting of a screw working in a swiveled sleeve actuated by a ratchet wheel and pawl. When the rod to which it is attached travels, as it must when the brakes are applied the screw is turned so as to take up the slack, and if it be more than a certain amount, the pawl engages in the next tooth, when the rod returns in its movement to release the brakes.

HINSON DRAFT GEAR. FIGS. 1185-96 and 1283-85. Various forms of friction and spring gear invented by J. A. Hinson. The distinguishing feature of the friction gears is the use of an auxiliary friction device actuated by the movement of the yoke.

HITCHCOCK CHAIR. A revolving and reclining chair with leg and foot rests.

HITCHCOCK COMBINATION HOT AND COLD WATER FAUCET. FIG. 2768.

HODGE BRAKE. An arrangement invented by Nehemiah Hodge, patented 1849, for operating the brakes on each truck of a car simultaneously, and equalizing the pressure on all the wheels. The brake may have one or two levers on each truck. Underneath the car body are two levers, called Hodge or floating levers, with movable fulcrums in their centers, which are connected together by a rod. One end of each of these levers is connected by a rod and chain to the brake shaft, and the other end of the floating lever is connected by a rod with the long arm of a brake lever on a truck.

HOG CHAIN "(Shipbuilding.) A chain in the nature of a tension rod passing from stem to stern of a vessel, and over posts nearer amidships; designed to prevent the vessel from dropping at the ends."—Knight.

Hence applied to certain forms of trusses in car construction. A hog chain is an inverted truss rod, and usually so called when applied in connection with and in similar form to a body truss rod, the object of a truss rod being to prevent a beam from sinking in the middle, and of a hog chain to prevent sinking at the ends when supported at the middle. Also called an overhang truss rod.

HOG CHAIN QUEEN POST. 221, FIGS. 360-72. See above. The struts over which the hog chain passes.

HOG CHAIN ROD (of a Passenger Car). See above. More properly a continuous counterbrace rod or an overhang truss rod.

HOISTING BLOCK (of a Derrick or Crane). The main block at the lower end of the hoisting chains carrying the sheave hook, or hoisting hook, to which the load is attached.

HOISTING BLOCK CLEVIS. A clevis carried at the top of a hoisting block to which the fixed end of the hoisting chain is attached. In some cases it is attached to a clevis at the upper end of the boom.

HOISTING CHAIN (of a Derrick, Steam Shovel or Crane). 18, FIGS. 357-59. The chain attached to the hoisting drum at one end and to the hoisting block or boom clevis at the other, by which the loads are raised.

HOISTING CHAIN SHEAVE. A pulley placed in some wrecking cars at the foot of the mast, when the hoisting gear is at some distance from it. The term is equally applicable to the mast sheave and boom sheave at the top of those parts of a derrick, but the latter are generally otherwise distinguished.

HOISTING DRUM (Steam Shovel). 20, FIGS. 357-59.

HOISTING ENGINE (Steam Shovel). 21, FIGS. 357-59.

HOISTING GEAR (Steam Shovel). 19, FIGS. 357-59.

HOISTING HOOK. See, SHEAVE HOOK. See also, HOISTING BLOCK.

HOKE CAR DOOR. FIGS. 1065-66.

HOLDER. "Something by which a thing is held."—Webster. A great variety of parts which serve this purpose are so called, as door holder, lamp holder, etc., which take their names from the thing which they hold.

HOLDER VALVE (Pintsch System). FIGS. 2472, 2534-35.

HOLLOW PISTON ROD (Freight and Tender Brakes). A brake cylinder piston rod which is hollow to receive the PUSH ROD or PUSH BAR, which see.

HOLLOW SPOKE WHEEL. FIG. 4186. See, CAR WHEEL and WHEEL.

HOOD. 1. See, PLATFORM HOOD. VENTILATOR HOOD. A roof apron which is attached to both platform roofs and platform hoods is sometimes called a hood.

2. (Heater.) More properly a ventilator or wind scoop. A horizontal tube or covering on the outside of a car, and on top of the cold air pipe, so as to give the latter a T-shape. The air is admitted to the pipe through the ends of the hood, which are covered with wire netting to exclude cinders. It has a valve which is moved by the current of air so as to admit it whichever way the car runs.

3. (For Urinal.) More properly ventilator cap.

HOOD BRACE (Buhoup Vestibule). 129, FIGS. 1526-1630 and 55, FIGS. 1784-86.

HOOD BRACE BRACKETS (Buhoup Vestibule). 125-128, FIGS. 1526-1630.

HOOD SUPPORT (Street Cars). A platform end post.

HOOK. See,

BELL CORD END HOOK.
BERTH CATCH HOOK.
BERTH CURTAIN HOOK.
BODY CHECK CHAIN HOOK.
CHECK CHAIN HOOK.
COAT AND HAT HOOK.
COAT HOOK.
COUPLING HOOK.
DOOR HOOK.
DOOR LATCH HOOK.
DRAWBAR COUPLING HOOK.
DRAW HOOK.
HAT HOOK.
HAT POST AND HOOK.
POUCH HOOK.
LAMP CASE HOOK.
SEAL HOOK.
STAKE HOOK.
TABLE HOOK.
TABLE LEG HOOK.
TRUCK CHECK CHAIN HOOK.
WINDOW CURTAIN HOOK.

HOOP (for Oil Lamps). A ferrule with an interior thread into which the burner screws.

HOOPSTICK (English). See, ROOFSTICK.

HOPPER. 1. (Passenger Cars.) FIGS. 3091-96. A closet hopper, or soil hopper.

2. (Freight Cars.) See, HOPPER BOTTOM CAR.

HOPPER BOTTOM CAR. FIGS. 41-46, also FIGS. 271-86. A car with an inclined bottom sloping from every side (or simply from the ends), to drop doors in the center, so that the entire contents can be discharged. They are chiefly used for carrying coal and other minerals. Hopper bottom gondola cars, FIGS. 34-37, 271-86, etc., have a similar bottom in their center. Hoppers are distinguished as box hoppers, those whose sides slope from the ends only, and as pyramidal, or those whose sides slope from the sides and ends. A hopper bottom car should be distinguished from a drop bottom, the latter not being provided with a hopper. See, GONDOLA CAR.

HOPPER BUTT HINGE. FIG. 1956. A hinge so named from its pointed form.

HOPPER CAR. FIGS. 41-46. See, HOPPER BOTTOM CAR.

HOPPER CARRY IRONS. A HOPPER SUPPORTING STRAP, which see.

HOPPER CHAIN. See, DROP DOOR CHAIN.

HOPPER DOOR (Hopper Cars). FIGS. 271-95. See, DROP DOOR.

HOPPER DOOR TOGGLE ARM (Hopper Cars). 104, FIGS. 271-95. A link in the drop door mechanism which is fastened to the door and forces it shut when the toggle link is forced down.

HOPPER DOOR TOGGLE LINK (Hopper Cars). 105, FIGS. 271-95. The arm in the drop door mechanism which forces down the toggle arms when the winding shaft is revolved and closes the doors.

HOPPER PLATES. The sheets of iron constituting the bottom of a hopper bottom car. Also termed inclined floor or hopper slope.

HOPPER SIDING. The planking that forms the side of a box hopper.

HOPPER SLOPE (Hopper Car). 27d and 27c, FIGS. 271-95. That part of the floor which slopes from the center of the car to both hopper doors. See, SIDE SLOPE and END SLOPE.

HOPPER STAYRODS Inclined rods passing through the center sill and to the hopper supporting strap at the hinged end of the doors to prevent the hopper from sagging in the middle.

HOPPER SUPPORT (Hopper Cars). 45, FIGS. 271-95. An angle riveted to the ridge of the hopper at the center and the top of the side sheet, forming a support for the hopper. It serves the same purpose as the HOPPER SUPPORTING STRAP, which see.

HOPPER SUPPORTING STRAP. A heavy U-shaped iron strap bent to the shape of the hopper of a gondola car, and the ends bolted to the side sills. Its office is to support the hopper, and it is usually applied at the end of the inclined floor, and in the middle of the hopper at which point the doors are hinged.

HOPPER VENTILATOR. FIG. 3103. See, BELL'S EXHAUST HOPPER VENTILATOR.

HORIZONTAL BRAKE SHAFT. 95, FIGS. 164-66. A brake shaft usually at the end of a car body, whose position is horizontal instead of vertical, so that it can be applied from below. When used it is commonly in combination with a long brake shaft of the ordinary kind at the other end of the car. It is for use in grain elevators, tunnels and in city yards, and chiefly on the Pennsylvania Railroad.

HORIZONTAL BRAKE SHAFT CHAIN. 104, FIGS. 159-69. A chain attached to a brake rod at the end of a car and running over a pulley to a horizontal shaft on which it is wound.

HORIZONTAL EQUALIZING LEVER. 27, FIGS. 1784-86. Pullman Vestibule. See, EQUALIZER.

HORIZONTAL TELEGRAPH COCK, OR FAUCET. FIGS. 2763-64. See, FAUCET.

HORNPLATE (English). The name given to the part of a locomotive or tender which on other railroad vehicles is termed AXLE GUARD (American, pedestal), which see.

HORSE BOX (English). A four wheeled covered vehicle adapted to run on passenger trains. It is fitted with large side doors and mangers, and is divided into three stalls by movable padded partitions. See also, RACEHORSE BOX.

HORSE CAR. 1. FIGS. 59-62. A box car fitted up especially for carrying horses, by leaving certain slatted openings, etc. They are then classed under the general name of box stock car. Some horse cars are very elaborate.

2. (STREET CARS), which see, drawn by horses, are very frequently called horse cars.

HORSE HOOK, OR TOWING HOOK (English). Nearest American equivalent, roping staple. An iron hook attached to the sole bar and forming an attachment for a rope by which the vehicle can be drawn. Horses are largely used for switching in England.

HORSE SHOE SEAL. FIGS. 3130-32. A cast-in wire and lead seal.

HOSE. Flexible tubing, made of leather, canvas, or india rubber, for conveying water, air, or other fluids. See also, BRAKE HOSE. COUPLING HOSE.

HOSE CLAMP. FIG. 946. A clamp to bind the hose to the hose nipple and coupling.

HOSE COLLAR. FIGS. 2336-37. A collar which surrounds the hose and binds it on the nipple. Also called hose band.

HOSE COUPLINGS. See, BRAKE HOSE COUPLINGS.

HOSE NIPPLE. FIG. 2338.

HOT WATER HEATER. See, BAKER HEATERS.

HOT WATER PIPES. P, FIG. 1781. Pipes running alongside of a car and under the seats, which contain hot water, and by which the car is heated. They are usually naked iron pipes, and the car is heated by convection as well as radiation. Between the seats the pipes on the side of the car have a hot water guard rail running along over and above them.

HOUSE CAR. An occasional term for a BOX CAR, which see.

HOUSING BOX. A JOURNAL BOX, which see.

HOWARD'S RAILROAD WATER CLOSET. FIGS. 3089-90. A device the essential feature of which is the connection between the seat lid and the pan and service measure, by which no water is carried to the pan except on opening the lid.

HUB (of a Car Wheel). The central portion, into which the axle is fitted. It is usually cylindrical in form and projects beyond the disks or spokes of the wheel on each side. In England termed the boss.

HUB BOLTS (Steel Tired Wheels) FIGS. 4177-81. Bolts fastening the face plates to the hub.

HUTCHINS METALLIC CAR ROOF. FIGS. 1749-66. An outside metallic roof.

HUTCHINS PLASTIC CAR ROOF. FIG. 1767. A form of roof consisting of two layers of boards, 6 inches wide and matched, and separated by a continuous sheet of Hutchins three-ply plastic roofing. See, CAR ROOF.

HYDRAULIC JACK. FIGS. 2978-82, 2985-86. A tool or machine in which the power is exerted by means of the pressure of some liquid acting against a piston or plunger, for raising heavy weights, like a car. The head and interior tube or ram form a reservoir, from which the fluid flows to the pump, and to which it is returned in lowering. From the pump it is forced, by the downward stroke of the piston, past the lower valve into the cylinder, and, this being closed at the bottom, the ram rises. The lever, which is made with a projection on one edge, slips into a socket at the side of the head. This socket passes through an arm on the interior of the head, and to this is fastened the piston of the pump. The claw attachment is a third tube, which screws into the head, below the ram collar and outside of the cylinder, at the lower end of which is a claw projecting out at one side. They are rated so that one man can raise the weight for which they are designed. The speed of lifting is inversely proportionate to the amount lifted. Ten tons can be lifted one foot in about a minute and a half. See, DUDGEON'S HYDRAULIC JACKS AND WATSON AND STILLMAN'S HYDRAULIC JACKS.

HYDRAULIC PRESSED CAR CANDLES. Candles made of paraffin by hydraulic pressure. See, CANDLES.

HYDROSTATIC BUFFER. A platform and buffing apparatus designed by Mr. A. G. Leonard and first applied to the Empire State Express between New York and Buffalo. It consists of a buffer plate extending the full width of the platform end sills, with two side, two intermediate and one center buffer stems. These center stems are backed up by springs, as is usual in other buffing apparatus, and in addition the center and side stems are enlarged at their ends and fitted so as to act as pistons in buffer stem cylinders. The two side and center cylinders are filled with a liquid and they are connected with suitable piping. The draw bar has attached to it a pressure bar, which is also fitted to a cylinder which has pipe connection with the center and side buffer

stems. The effect of this arrangement is to equalize the pressure upon the buffer plate. If one side buffer stem receives more than its proportion of the thrust the fluid conveys the hydrostatic pressure to the other side and center and tends to equalize it. When the draw bar is drawn out the pressure bar piston forces the fluid from its cylinder into the buffer stem cylinders and forces out the buffer plate, insuring contact at all times between the buffer plates. Folding steps are required, since the buffing apparatus takes up the full width of the platform.

I

I Beam. A general term applied by makers to any form of rolled iron having an I cross section. The top and bottom parts are termed the flanges, and the middle the web. The usual dimensions are given by the total height from out to out, and vary from 3 to 15 inches. When one of the flanges is simply a round bar it is termed a deck beam. I beams are used for center and intermediate sills, also for truck bolsters.

Ice Car. A car for transporting ice, usually constructed with double roofs, floors and sides, filled in with sawdust or other non-conducting substance.

Ice Pan (Refrigerator Cars). The receptacle for carrying ice, especially roof ice pans, in distinction from ice racks, at the ends of the car.

Inclined Floor (Coal Cars). 27, 27a, 27b, 27c, figs. 271-95. Subdivided into inclined end floor and inclined side floor, the latter not always used.

Inclined Floor Cross Bar (Hopper Bottom Coal Car). Cross bars passing from one sill to the other, in the modern cars usually of iron, supporting the inclined hopper plates, or wood floor.

Inclined Floor Timbers (Coal Car). The wooden sills to which the inclined floor of a coal car is nailed.

Inclined Plane Car. A passenger street car which is drawn by a wire rope on a steep inclined plane. The car is so arranged that the floor will be level when the wheels are on the incline, by making the wheels at one end larger than at the other, or by raising up one end of the car body.

Inclined Side Floor (Coal Car). See, Inclined Floor.

India Rubber. A gum which exudes from a tropical tree growing in the East and West Indies, Mexico, South America, etc. It is prepared for use by vulcanizing with a greater or less proportion of sulphur, according to the stiffness required.

India Rubber Body Cushion, or Attock's Body Block (English). A piece of rubber about 6 in. by 3 in. by 1 in. thick, interposed between the body and the under frame, serving to deaden noise and vibration and permit a free circulation of air to the floor timbers.

India Rubber Floor Mat. Figs. 2174-75. See, Floor Mat. They are either perforated or corrugated.

Ingate. "The aperture in a casting mold at which the melted metal enters."—Knight. Often called a gate.

Ingoldsby Dump Car. Figs. 33, 40. A self clearing car for carrying coal, ore, ballast or other bulk freight. The doors in the bottom are operated by gears at the end of the car.

Injector. A large hood or wind scoop on the roof of the car to catch the air and force it through the various pipes into the car. Corresponding parts are called hoods, jacks, ventilators, ventilator jacks, wind scoops, etc.

Injector Bottom (Pintsch Lamp). 461, figs. 2605-21.

Injector Knob (Pintsch Lamp). 462, figs. 2605-21.

Injector Plate (Pintsch Lamp). 460, figs. 2605-21.

Injector Top (Pintsch Lamp). 459, figs. 2605-21.

Inner Face Plate (Vestibule). 4, figs. 1784-86. Also called back face plate.

Inner Intermediate Sills. 3, figs. 159-69, 185-95, 246-50, etc. Those two intermediate sills next to the center sills. See, Outer Intermediate Sills.

Inner Lamp Ring (English). An ornamental or wooden ring in the inner surface of the roof surrounding the aperture for the Roof Lamp, which see.

Inside Body Corner Knee (English). American equivalent, sill knee iron or corner plate, which latter is used outside instead of inside. A wrought iron knee placed in a horizontal plane securing the end and side of the body together.

Inside Casing (Baker Heater). Fig. 2239. Sheet iron or steel plate bent and riveted into the shape of a frustum of a cone, which forms the top of the fire pot.

Inside Casing (English). Boards in the inside of the body attached to the framing of the sides and ends. Also called inside lining.

Inside Ceiling (Refrigerator Car). K, figs. 185-95. The inside layer of light boards in the roof of the car.

Inside Cornice (Passenger Car Interiors). 94, figs. 388-91. A molding which fills the angle where the roof joins the side of the car.

Inside Cornice Fascia Board. 95, figs. 388-91. A projecting board which forms a molding or ornament under the inside cornice. The sub-fascia board lies under it. The arrangement of these details, however, is frequently varied.

Inside Cornice Sub-Fascia Board. Z, fig. 1781. See above.

Inside Deck Cornice. 120, figs. 388-91.

Inside End Piece (Truck Frame). The end piece which is nearest to the center of the car. It is usually straight, while the outer one is cut away on top so as to make room for the draft rigging.

Inside Frieze Panel (Street Cars). A panel on the inside over a window.

Inside Hand Rail (Street Cars). A rail, usually made of wood, attached to the rafters by metal brackets, and carrying leather straps in the form of loops for passengers to hold fast to.

Inside Hung Brakes. Figs. 821-22. Brake attachments for trucks in which the brake shoes and beams are between the wheels. When attached on the outside they are Outside Hung Brakes, which see.

Inside Lining. 1. 53, figs. 159-69; 53b and A, figs. 185-95; 97, figs. 388-91. The boarding which is nailed to the insides of the posts of freight, baggage and other cars. In box cars it extends half way up only, to the girth. Inside lining becomes sometimes inside sheathing when it is carried up to the roof, and is the only sheathing for the car, the frame being left exposed.

2. (English.) See, Inside Casing.

Inside Lining Cap. A Girth or Belt Rail, which see. See also above.

Inside Lining Stud. A stud extending from the side sill to the girth to serve as a "nailer" for the inside lining.

Inside Roof. 86c, figs. 159-69. A light roof under the main roof and separated from it by the purlius.

Inside Spring Case. A shell cast on the spring plates to keep the coils in place.

Inside Wheel Piece Plate. 12, figs. 3735-3951. See, Wheel Piece.

Inside Window Panel. 89, figs. 388-91; 10, figs. 1778-83. A panel inside of a passenger car between the windows.

Inside Window Sill. 78, figs. 388-91; J, fig. 1781, etc. A horizontal piece of wood under the window on the inside.

Inside Window Stop. A wooden strip attached to a window post on the inside of a window blind or an inner sash of a double window. It forms a groove in which the blind or window sash slides. Also called window casing. Sometimes the window molding forms a stop on the inside.

Inspection Car. 1. A car used for inspecting track of a railroad. In inspecting the track it is pushed in front of a locomotive.

2. FIGS. 4716, 4720. A hand car used for very much the same purpose. Three wheeled hand cars are also used by roadmasters for inspection. See, HAND CAR.

3. FIG. 4716. A small car propelled by gasolene with seats for four to six persons.

INSTRUCTION CAR. FIGS. 140, 155-57 (Air Brake). A car maintained by the Westinghouse Air Brake Co. and by some railroads to send out over the line in charge of experts, and with a full equipment of air brake apparatus, for the purpose of instructing employes required to operate or inspect air brakes as to their construction, operation and proper maintenance. The same end is accomplished by some roads by establishing instruction shops or schools at certain points along the road and requiring employes to attend the same.

INSULATING PAPER (Refrigerator Cars). B, FIGS. 185-95. A heavy tar paper placed between the linings to aid the insulation of the contents of the car from heat.

INTAKE AIR VALVES (Air Pump). 9-10, FIG. 965.

INTERCHANGE OF TRAFFIC, RULES FOR. These rules make car owners responsible for, and therefore chargeable with, the repairs to their cars necessitated by ordinary wear and tear in fair service, so that defect cards will not be required for any defects thus arising.

Railroad companies handling cars are responsible for damage done to any car by unfair usage, derailment or accident, and for improper repairs made by them, and they should make proper repairs at their own expense, or issue defect card covering all such damage or improper repairs.

CARE OF FOREIGN FREIGHT CARS.

RULE 1. Each railway company shall give to foreign cars, while on its line, the same care as to oiling, packing and inspection, that it gives to its own cars.

INTERCHANGING FREIGHT CARS.

RULE 2. Cars offered in interchange must be accepted if in safe and serviceable condition, the receiving road to be the judge in cases not provided for in Rules 3 to 54 inclusive.

USE OF DEFECT CARDS.

RULE 3. Defect cards shall be 3½ inches by 8 inches, and of the form shown below. They should be printed in red ink on both sides, and shall be filled in on both sides with ink or black indelible pencil. The cards must plainly specify in full each item for which charges are authorized, indicating on which end of the car the defects exist. The end of the car upon which the brake staff is located shall be known as "B" end, and the opposite end shall be known as "A" end. Where there are two brake staffs on the same car, the end toward which the cylinder push rod travels shall be known as "B" end.

M C. B. DEFECT CARD

(*Name of Road.*)

Car No .....Date.....

Initial .....Line.....

Will be received at any point on this company's line with the following defects:

NOTE.—Fill in defects on both sides with ink or black indelible pencil. Attach this card with four tacks on outside face of intermediate sill, between cross-tie timbers.

.....

.....

.....

.....Inspector at.....

Send bill on this card to

RULE 4. Defect cards shall not be required for defects for which owners are responsible, except for missing material on cars offered in interchange, as provided for in Rules 27 and 39, neither shall they be required of the delivering road for improper repairs that were not made by it, with the exception of the cases provided for in Rules 31, 40, 42 and 43.

RULE 5. If a car has defects for which the owners are not responsible, but which do not render it unsafe to run, nor unsafe to trainmen, nor to any lading suitable to the car, the receiving road may require that a defect card be securely attached to the car with four tacks, preferably on the outside face of intermediate sill, between cross tie timbers.

RULE 6. Duplicate defect cards shall be furnished for lost or illegible cards.

For defects of wheels, rules 7 to 21, see WHEELS.

DEFECTS OF AXLES WHICH JUSTIFY RENEWAL.

RULE 22. Axles broken, or having seamy journals, fillets at the back shoulder worn out, or with collars broken or worn to ¼ inch or less, under fair usage.

RULE 23. Axles less than the following prescribed limits:

Capacity of car.	Journal.	Wheel seat.	Center.
100,000	5 inches.	6¾ inches.	5⅞ inches.
80,000	4½ "	6¼ "	5 5-16 "
70,000	4 "	5⅝ "	4⅞ "
60,000	3¾ "	5 "	4⅝ "
50,000	3½ "	4¾ "	4⅛ "
40,000	3¼ "	4⅝ "	3⅞ "
30,000	3 "	4¼ "	3½ "
20,000	2¾ "	4¼ "	3½ "

All cars to have their capacity stenciled on them.

} Owners responsible.

RULE 24. Cut journals, axles bent or axles rendered unsafe by unfair usage, derailment or accident.

} Delivering Company responsible.

DEFECTS OF TRUCKS WHICH JUSTIFY REPAIRS IF OWNERS ARE RESPONSIBLE, OR REPAIRS OR CARDING IF DELIVERING COMPANY IS RESPONSIBLE.

RULE 25. Defective, missing or worn out parts of trucks not elsewhere provided for, which have failed under fair usage, or if any part of the truck frame or attachments is less than 2½ inches above the top of the rail.

} Owners responsible.

RULE 26. Damage of any kind to the truck due to unfair usage, derailment or accident.

RULE 27. Material missing from trucks of cars offered in interchange.

RULE 28. Journal bearings and journal box bolts which require renewal by reason of change of wheels or axles for which the delivering company is responsible, regardless of the previous condition of the bearings.

} Delivering Company responsible.

For defects of brakes, rules 29 to 34, see BRAKES.

DEFECTS OF BODIES WHICH JUSTIFY REPAIRS IF OWNERS ARE RESPONSIBLE, OR REPAIRS OR CARDING IF DELIVERING COMPANY IS RESPONSIBLE.

RULE 35. Locks, grain doors and all inside or concealed parts of cars missing or damaged under fair usage, and failure or loss under fair usage of any part of the body of the car, except as provided for in Rules 39 and 84.

RULE 36. Cars not within the limits of standard height for couplers, 31½ inches to 34½ inches for standard gauge cars.

RULE 37. Steps, ladders, handholds or running boards in bad order or insecurely fastened, or absence of grabirons or handholds as required by law. Handholds or grabirons must be of wrought iron or steel and secured by bolts or lag screws.

} Owners responsible.

RULE 38. Damage of any kind to the body of the car due to unfair usage, derailment or accident.

RULE 39. Material missing from body of cars offered in interchange, except locks, grain doors and all inside or concealed parts of car.

RULE 40. M. C. B. couplers not equipped with steel or wrought iron knuckles.

RULE 41. Cars intended to be equipped with metal brake beams and so stenciled, if found with wooden brake beams.

RULE 42. Cars equipped with M. C. B. couplers having pocket rear end attachments and so stenciled, if found with tail pin attachments instead of pocket.

Delivering Company responsible.

RULE 43. Uncoupling attachments of M. C. B. couplers offered in interchange must be made operative before moving from interchange point.

Delivering Company responsible.

IMPROPER REPAIRS.

RULE 44. Any company making improper repairs is solely responsible to the owners, with the exception of the cases provided for in Rules 31, 40, 41, 42 and 43.

RULE 45. The company making such improper repairs shall place upon the car, at the time and place that the work is done, an M. C. B. defect card, which card shall state the wrong material used.

Company making repairs responsible.

COMBINATIONS OF DEFECTS WHICH DENOTE UNFAIR USAGE IF CAUSED AT ONE AND THE SAME TIME AND AT THE SAME END OF CAR.

RULE 46. Damaged coupler, accompanied by damage to either coupler stop, filling block, draft timber or its substitute, or end sill.

RULE 47. Damaged coupler pocket, spindle or their substitutes, accompanied by damage to either draft timber or its substitute, or end sill.

RULE 48. Damaged coupler stop or filling block, accompanied by damage to either coupler or end sill.

RULE 49. Damaged draft timber or its substitute, accompanied by damage to either coupler, coupler pocket, spindle or its substitute, or to end sill.

RULE 50. Damaged wood or iron buffer block, accompanied by damage to end sill.

RULE 51. Damaged end sill, accompanied by damage to either coupler, coupler pocket, spindle or its substitute, coupler stop, filling block, draft timber or its substitute, wood or iron buffer block, or longitudinal sill.

RULE 52. Damaged longitudinal sill, accompanied by damage to end sill.

RULE 53. Damaged longitudinal sills, if necessitating replacement or splicing of more than two sills.

RULE 54. Damaged corner and end posts, if necessitating the replacement of or repairs to more than two end or two corner posts at one end, or more than one end and one corner post at same end of car.

The word "coupler" in the above rules, 46 to 54, inclusive, means the coupler body or knuckle.

INSTRUCTIONS TO REPAIR MEN.

RULE 55. Any car having defects which render it unsafe to run, unsafe to trainmen, or to any lading suitable to the car, may be repaired.

RULE 56. Repairs to foreign cars shall be promptly made, and the work shall conform in detail to the original construction, and with the quality of material originally used, except that malleable iron M. C. B. standards may be substituted for gray iron M. C. B. standards, and gray iron may be used in place of malleable where gray iron is an M. C. B. standard, provided that in substituting malleable iron for gray iron the price of gray iron is used, and except as provided for in Rules 60 and 61.

RULE 57. In repairing damaged cars M. C. B. standards may be used when of dimensions that do not impair the strength of the cars, in lieu of the parts forming its original construction. When using materials for repairs to foreign cars for which the Master Car Builders' Association has adopted specifications as a standard, the materials must comply with the requirements of these specifications.

RULE 58. In making repairs for which owners are responsible, 30-inch and 36-inch wheels may be replaced with 33-inch wheels, if practicable. If changes are necessary in order to bring the car to the proper height, the cost of so doing shall also be chargeable to the car owner.

RULE 59. Couplers of the vertical plane type other than M. C. B. replaced with M. C. B. standard, the expense of alteration thus necessitated shall be chargeable to car owners.

RULE 60. When M. C. B. couplers of another make are placed upon a car, the uncoupling arrangements shall be made operative at the expense of the company making the repairs.

RULE 61. When M. C. B. couplers, knuckles, metal brake beams, wheels or axles are replaced under conditions which make them chargeable to the owner, it must be plainly stated on the repair card and stub whether the material is new or second hand.

RULE 62. Any company finding cars not within the limits of standard height for couplers may make repairs and charge to owners. Cars should be adjusted in height when empty, as far as possible, and in order to justify a bill for this work under the Rules of Interchange an empty car measuring 32½ inches or less should be adjusted to 34½ inches, or within ¼ inch thereof, and when it is necessary to alter a loaded car it should be adjusted to 33½ inches, or within ¼ inch thereof, or as nearly as possible to such height as will bring it to 34½ inches when the car is unloaded, the height to be measured from top of the rails to the center line of the coupler shank.

RULE 63. Center sills or draft timbers must not be spliced. All other sills may be spliced once. When the sills are less than 12 inches in depth the plan shown in FIG. 8 is to be followed:

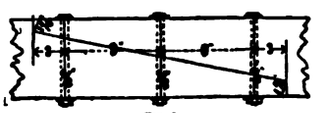


FIG. 8.

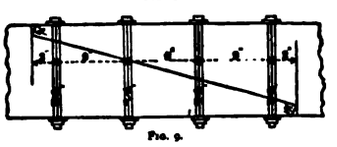


FIG. 9.

When the sills are 12 inches or more in depth the plan shown in FIG. 9 is to be followed:

The splice may be located either side of body bolster, but the nearest point of any splice must not be within 12 inches of same. The splicing of two adjacent sills at the same end of the car, or the splicing of any sill between cross tie timbers, will not be allowed.

RULE 64. Wheels on the same axle must be of the same circumference.

RULE 65. New wheels must not be mated with second-hand wheels.

RULE 66. Prick punching or shimming the wheel fit must not be allowed.

RULE 67. The wheel seats of foreign axles must not be reduced more than 1-16 inch to fit the wheels, and in no case must they be reduced below the limits given in Rule 23.

RULE 68. Any company repairing foreign cars with wrong material, and not in compliance with the Rules 55 to 68, inclusive, shall be liable to the owners for the cost of changing such car to the original standard, or to the requirements of these rules, except that companies applying axles smaller than the limits given in Rule 23 shall not be held responsible for improper repairs if the car is not stenciled showing the capacity of the car.

RULE 69. In replacing air brake hose on foreign cars for which bills are made, new hose must be used.

RULE 70. If the weight of a car is found to vary more than 500 pounds from the light weight stenciled on the car a railroad company having the car in its possession may weigh and restencil the car, making a charge for each car weighed and so reported. The railroad company making the bill shall notify the owner, giving the date and point at which the reweighing was done.

RULE 71. Cars undergoing extraordinary repairs, such as sills, resheathing, roofing, etc., should be reweighed and restenciled by the company having the car in its possession at its own expense, and the owner notified.

RULE 72. When secondhand axles are applied under conditions which make them chargeable to the owners, the diameters of such axles applied should not be less than ⅛ inch above the limit dimensions given in Rule 23.

USE OF REPAIR CARD.

RULE 73. When repairs of any kind are made to foreign cars a repair card shall be securely attached to outside face of intermediate sill between cross tie timbers. This card shall specify fully the repairs made, and reason for same, the date and place where made, and name of road making repairs; also show location of parts repaired or renewed. The end of car on which brake staff is located shall be known as "B" end, and the opposite end as "A" end. Where there are two brake staffs on the car, the end toward which the cylinder push rod travels shall be known as "B" end. The card shall be provided with a stub, which will duplicate information on the card, and stubs must be forwarded with the bill.

If no bill is to be rendered, the repair card stub must be forwarded on or before the twentieth day of each month, with the words "no bill" written across the face of the repair card stub. In case it is not the intention to render bill, the words "no bill" shall be written across the face of the repair card.

RULE 74. The repair card shall be 3½ by 8 inches, and the stub 3½ by 4 inches. The card shall be printed on both sides in black ink, and shall be filled in on both sides with ink or black indelible pencil, and be of the following form:

The cards and stubs must state whether solid or filled journal bearings are applied or removed.

RULE 75. Any road making partial repairs of defects on a car which are covered by defect cards will have the defects repaired crossed off the original card with ink or indelible pencil and card placed back on car. A copy of the card accompanying the bill with the defects which were not repaired crossed off will be sufficient authority to bill.

RULE 76. Duplicate repair cards shall be furnished for lost or illegible cards.

INSTRUCTIONS FOR BILLING.

RULE 77. Bills may be rendered for work done under Rule 55, except in cases where owners are not responsible and the car bears no defect card covering the defects repaired, stating upon the bill the date and place where the repairs were made; the repair card stub or defect card to accompany the bill.

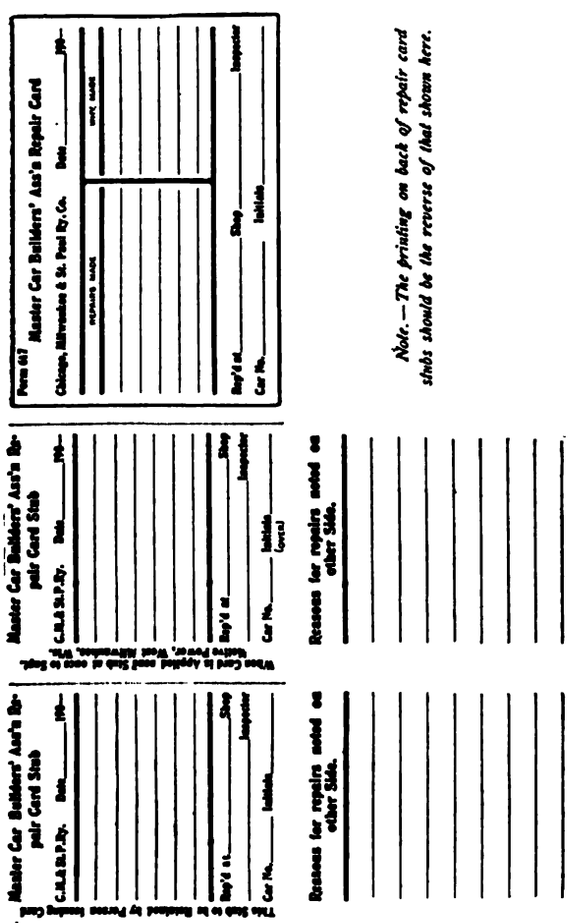
RULE 78. Car owners may require receipt of repair card or stub before payment of bill for repairs.

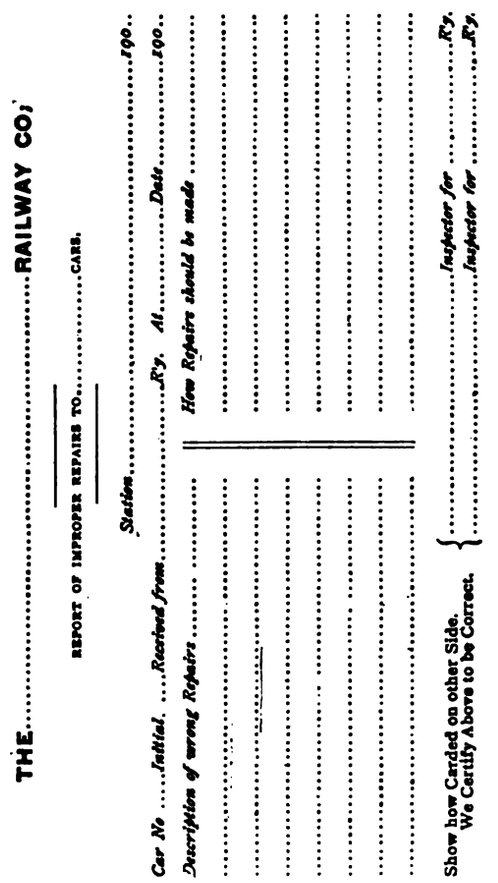
RULE 79. For repairs made on defect cards, the card must accompany the bill as voucher for the work done, but no bill shall be rendered for repairs which have not been made.

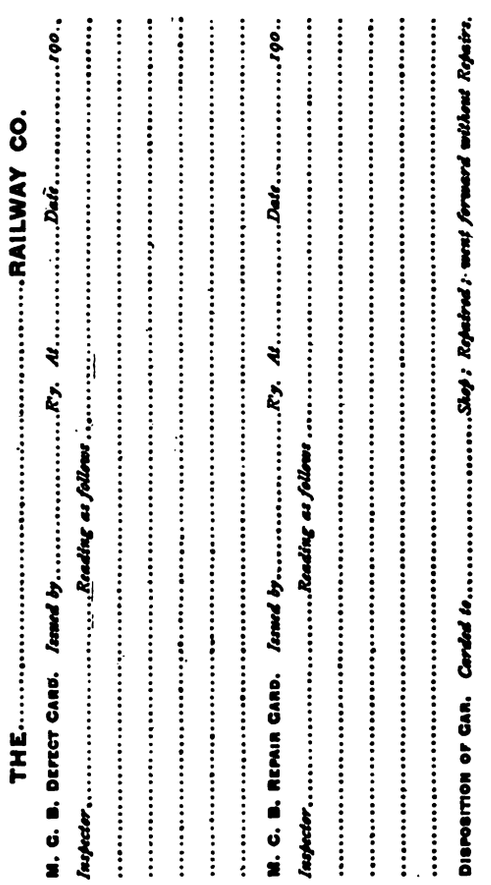
RULE 80. When improper repairs of owner's defects have been made and bill rendered, the owner may counter bill against the company making the wrong repairs for the cost of changing the car to the original standard, or to the requirements of Rules 55 to 76, inclusive, if the work is done.

RULE 81. When improper repairs of defects for which owners are not responsible are made, the owner may make bill against the company making the improper repairs for the cost of changing the car to the original standard, or to the requirements of Rules 55 to 76, inclusive, if the work is done.

RULE 82. The evidence of a joint inspector or the joint evidence of two persons, one representing the owner of the


Master Car Builders' Ass'n Repair Card
Master Car Builders' Ass'n Repair Card Stub
Reasons for repairs noted on other Side.
Note.—The printing on back of repair card stubs should be the reverse of that shown here.


THE.....RAILWAY CO;
REPORT OF IMPROPER REPAIRS TO.....CARS.
Station.....190..
Car No .....Initial. ....Received from.....R'y. At.....Date.....190..
Description of wrong Repairs .....How Repairs should be made .....
Show how Carded on other Side.
We Certify Above to be Correct.
Inspector for .....R'y.
Inspector for .....R'y.



THE.....RAILWAY CO.

M. C. B. DEFECT CARD. *Issued by*.....*Ry. At*.....*Date*.....190..

Inspector.....*Reading as follows*.....

.....

.....

.....

.....

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M. C. B. REPAIR CARD. *Issued by*.....*Ry. At*.....*Date*.....190..

Inspector.....*Reading as follows*.....

.....

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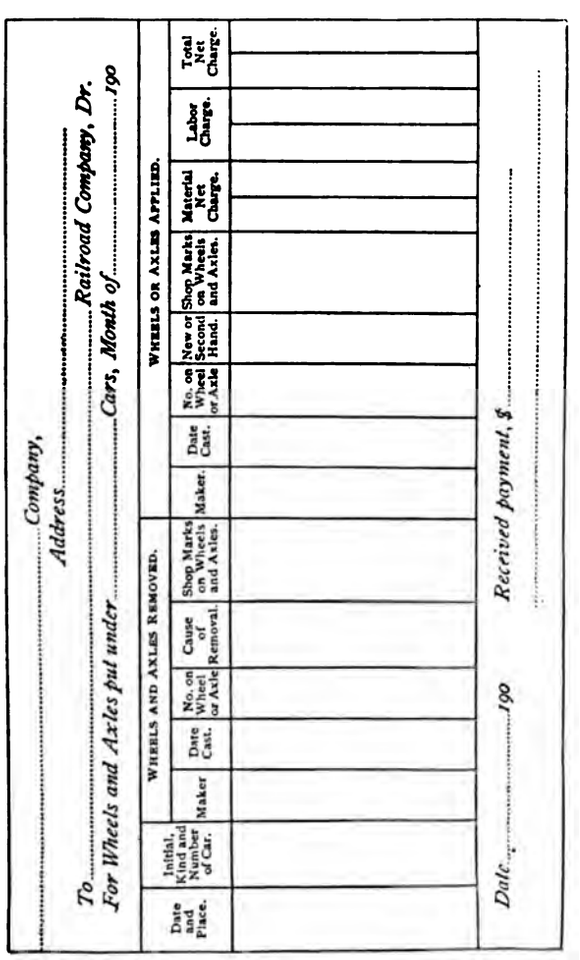
DISPOSITION OF CAR. *Carded to*.....*Shop; Repaired; sent forward without Repairs.*

car, and the other representing the delivering road, that the repairs are not proper, shall be final. A joint evidence card shall be used for this purpose, which shall describe



.....Company,

Address.....

To.....Railroad Company, Dr.

For Wheels and Axles put under.....Cars, Month of.....190

Date and Place.	Initial, Kind and Number of Car.	WHEELS AND AXLES REMOVED.					WHEELS OR AXLES APPLIED.						
		Maker	Date Cast.	No. on Wheel or Axle	Cause of Removal.	Shop Marks on Wheels and Axles.	Maker.	Date Cast.	No. on Wheel or Axle	New or Second Hand.	Shop Marks on Wheels and Axles.	Material Net Charge.	Labor Charge.	Total Net Charge.

Date.....190 Received payment, $.....

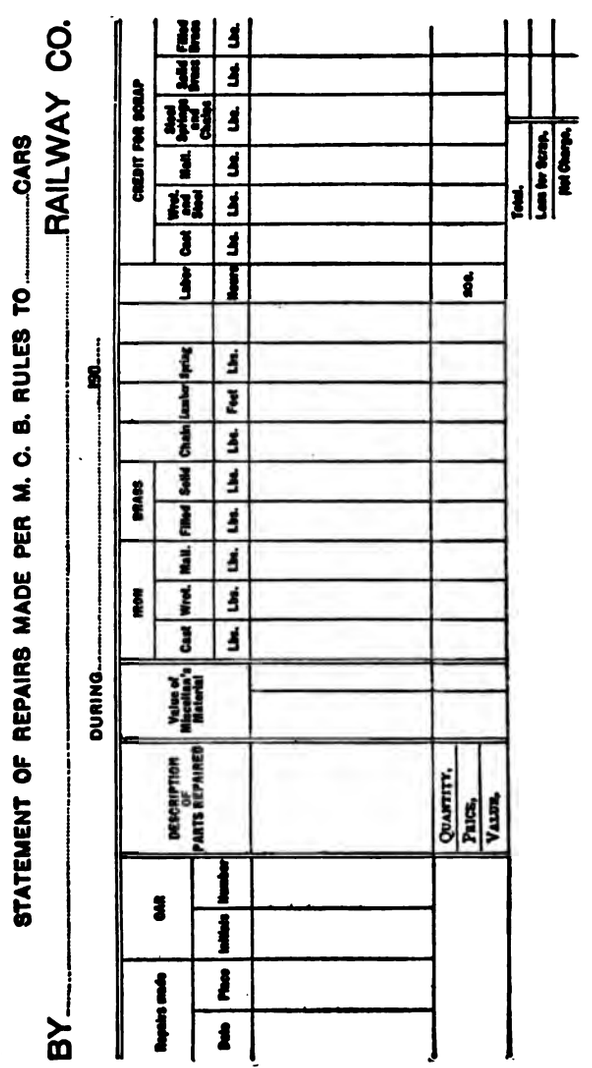
.....

and show location of parts repaired or renewed. The end of the car on which the brake staff is located shall be known as "B" end, and the opposite end as "A" end. Where there are two brake staffs on the car, the end toward which the cylinder push rod travels shall be known as "B" end. This card shall be of the following form:

RULE 83. The joint evidence card shall not be used as authority for rendering a bill, but shall be sent to the company against which evidence is presented, and it shall furnish defect card covering the wrong repairs if it made them. The joint evidence card, accompanied by a proper repair card, upon which a bill has been made, shall be used as authority for rendering bill, but if unaccompanied by such repair card, the joint evidence card shall be sent to the company against which the evidence has been presented, and it shall furnish a defect card covering the wrong repairs if it made them.

RULE 84. Bills may be rendered against car owners for the labor only of replacing couplers, brake beams (including their attachments, such as shoes, heads, key bolts, jaws and hangers), brake levers, top and bottom brake rods that have been lost on the line of the company making the repairs. Coupler springs, followers and yokes may be included in the above, providing they have been lost with the couplers.

RULE 85. In making bills under these rules, the information necessary for the car department should be embodied on the following forms, whether the same is made as a bill or a statement to accompany a bill:



STATEMENT OF REPAIRS MADE PER M. C. B. RULES TO .....CARS

BY.....RAILWAY CO.

DURING.....190....

Repairs made	CAR	DESCRIPTION OF PARTS REPAIRED	Value of Mechanic's Material	IRON			BRASS						Labor	CREDIT FOR SCRAP						
				Cast	Wrot.	Mall.	Filled	Solid	Chain	Leather	Spring			Cast	Wrot. and Steel	Malleable	Steel Springs and Chains	Solid Brass	Filled Brass
				Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Feet	Lbs.		Hours	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Date	Initials																		
Place																			
	Number																		
		QUANTITY.																	
		PRICE.																	
		VALUE.																	

Total.

Less for Scrap.

Net Charge.

RULE 86. Bills rendered for wheels and axles shall be in accordance with the following schedule of prices for material, with the proper debits and credits:

	New.	Second hand.	Scrap.
One 36-inch wheel	$10.00	$7.50	$5.00
One 33-inch wheel	8.50	6.75	4.50
One axle, 100,000 lbs	24.00	13.50	7.75
One axle, 80,000 lbs	19.00	11.00	6.50
One axle, 660,000 lbs	14.00	7.75	5.25
One axle, 50,000 lbs. (or under)	12.00	6.50	4.50

and with an additional charge of $1.50 for all labor for each pair of wheels and axles removed from the truck. If new wheels and axles are substituted for second hand wheels and axles, proper charges and credits shall be allowed, although such substitution be made on account of only one loose or defective wheel, or a defective axle, with the following exceptions: In case the owner of a car removes a damaged wheel or axle, no charge shall be made for any difference in value between the parts used and those removed that are not damaged.

RULE 87. If car owner elects on account of improper repairs to remove M. C. B. standard axles suitable to the capacity of the car, he shall allow credit for second hand axles if they are in good order. Axles removed below the journal limit of 100,000 pounds, 80,000 pounds and 40,000 pounds capacity to be credited as scrap when removed.

RULE 88. Bills for wheel and axle work must make specific mention of each axle and wheel removed or applied.

RULE 89. Bills which do not embody all the information called for by the headings of the columns may be declined until made to conform to the requirements of the rule. If no marks are found on wheels or axles removed, a notation to that effect must be made on face of bill.

RULE 90. In noting on bills the cause of removal of wheels and axles, the terms used in Rules 7 to 21, inclusive, shall be used, and the dimensions of the defect or variation from the prescribed limits should be carefully specified.

RULE 91. Bills for repairs made under these rules and for material furnished shall be in conformity with schedules of prices and credits for the articles enumerated below:

Material.	Charge.	Credit.
Air brake hose, 1¼ inch, complete with fittings applied	$2.00	.....
Air brake hose, 1¼ inch, credit for fittings for same	.....	$0.80
Air brake hose, 1 inch, complete with fittings applied	1.75	.....
Air brake hose, 1 inch, credit for fittings for same	.....	.80
Angle cock	1.40	.....
Angle cock handle	.08	.....
Auxiliary reservoir	2.45	.....
Bolts, nuts and forgings, finished.....per lb.	.03	¾c.
Brake shoes applied; no credit for scrap	.80	.....
Castings, rough iron.....per lb.	.01¾	6-10c.
" " malleable iron..... "	.08	½c.
" " steel ..... "	.04½	¾c.
Chain ..... "	.05	.01
Coupling, dummy	.10	.....
Coupler, M. C. B., one, complete, new	7.50	For credits for broken parts of coupler renewed see Rules 91 and 99.
Coupler body, one, new	4.50	
Other individual malleable, wrought or steel parts .....per lb.	.03½	
Cut-out cock	1.20	
Cut-out cock handle	.08	
Cylinder, body (8 by 11 inches)	1.60	.....
" piston and rod	.95	.....
" piston follower	.10	.....
" piston packing leather	.40	.....
" " " " expander	.05	.....
" " release spring	.50	.....
" non-pressure head	.50	.....
" gasket	.05	.....
Door, for end of box or stock car, wooden, each, applied; no credit for scrap	1.75	.....
Door, for end of box or stock car, ventilated (wooden frame with iron rods), each, applied; no credit for scrap	3.00	.....
Door, for side of box or stock car, wooden, each, applied; no credit for scrap	3.50	.....
Door, for side of box or stock car, ventilated (wooden frame with iron rods), each, applied; no credit for scrap	5.00	.....
Door, for side of stock car, with iron rods, each, applied; no credit for scrap	4.00	.....
Gasket, air hose coupling	.04	.....
Half door, for side of box or stock car, each, applied; no credit for scrap	2.50	.....
Iron, galvanized.....per lb.	.04	.....
Journal bearings of brass or bronze, lined or unlined, per lb., applied	.16	.11
Journal bearings, filled brass or bronze shell, per lb., applied	.12	.09

The weight charged for new journal bearings for 7 inch journals and over, but not 8 inches long, shall not exceed 10 pounds; the weight charged for new journal bearings for journals 8 inches long and less than 9 inches long shall not exceed 13 pounds; and for new journal bearings 9 inches long or over, but not 10 inches, 20 pounds. The weight charged for new journal bearings for 100,000 pound capacity cars (5½ by 10 inches) shall be 25 pounds. The weight of scrap credited must be one-half the weight of the bearing charged.

Labor, per hour	.20	.....
Lumber—yellow, white and Norway pine, poplar, oak, hickory and elm, dressed and framed, per ft. BM. required to make the part	.02½	.....
Nails .....per lb.	.03	.....
Paint, lead, freight car, mixed..... "	.15	.....
Paint, mineral, freight car, mixed..... "	.05	.....
Pipe, nipple on end of train pipe	.10	.....
Pipe, ⅝ inch, per foot	.03	.....
" 1¼ inch per foot	.07	.....
Pressure retaining valve	1.00	.....
Release valve	.70	.....
Release valve handle	.08	.....
Release rod	.10	.....
Steel for springs, rough.....per lb.	.04	¾c.
" helical springs..... "	.03½	.01
Train pipe air strainer (1¼ inch)	.55	.....
Triple check valve case	.80	.....
" cylinder cap (drain cup)	.70	.....
" " " " gasket	.35	.....
" emergency valve	.55	.....
" " " seat	.50	.....
" " " piston	.45	.....
" " " rubber seat	.05	.....
" " check valve	.25	.....
" " " spring	.02	.....
" " " case gasket	.08	.....
" graduating spring	.05	.....
" " stem	.15	.....
" " " nut	.25	.....
" " valve	.05	.....
" piston and ring	1.75	.....
" " ring (only)	.25	.....
" slide valve	.90	.....
" " " spring	.05	.....
" valve strainer	.05	.....
" " gasket	.15	.....

RULE 92. Not more than one pound of mineral paint can be charged for 15 square feet of surface covered, and not more than one pound of lead paint for 12 square feet of surface covered. No charge to be made for lettering.

RULE 93. Whenever scrap credits are allowable the weights of scrap credited shall be equal to the weights of the new metal applied, except as otherwise provided in the rules, and except in the case of scrap M. C. B. couplers, and parts of same, and material applied on defect cards, in which cases the weight and kind of metal removed shall be credited.

RULE 94. In the application of channels they should be charged out at the market price plus the necessary labor for drilling, etc.; credit should be at prices quoted above for similar metal.

RULE 95. Bills shall not be rendered for amounts less than 25 cents in aggregate, but charges for items less than 25 cents may be held until they amount to that sum, provided said aggregate is rendered within 60 days. No bill shall be returned for correction on account of error for less than 100 cents in aggregate of bill, but said bill shall be passed for payment at once, and the alleged error brought to the attention of the road rendering the same within sixty days from date of bill. The receiving road shall at once issue a letter of authority for counter bill to cover the acknowledged error, said letter to be attached to the bill as authority.

RULE 96. All offices rendering bill should consolidate all charges against any one company into one monthly bill.

RULE 97. Journal bearings having a lining ¼ inch thick or thicker shall be charged as filled journal bearings, and not as lined journal bearings.

RULE 98. In rendering bills for owner's defects the following should be observed:

No credit for scrap and no charge for labor shall be allowed in renewing brake shoes.

RULE 99. When M. C. B. coupler parts or metal brake beams are replaced, good second hand material may be used, but they must be charged at seventy-five per cent. of the prices when new. The credits for similar parts released from service in good condition must also be seventy-five per cent. of the prices when new.

RULE 100. Manufactured articles not included in the above list must be charged at current market prices, without freight charges.

RULE 101. When M. C. B. couplers are changed in Canada to replace wrong material, couplers may be charged at the prices fixed by the rules plus the customs duty paid on entering Canada.

RULE 102. No percentage to be added to either material or labor.

RULE 103. Bills for the following work, to make cars conform to United States laws and to conform to the requirements of Rule 62, must be rendered within 60 days after the work is done, and must state the height of the car before and after altering.

Altering height of one end of one car	$1.00
Putting on one hand hold or grab iron	.20

RULE 104. The following table shows the number of hours which may be charged for labor in doing the various items of work enumerated, which includes all work necessary to complete each item of repairs, except in so far as labor is already included in charges for materials:

	Ordinary Cars. Charge for Hrs.	Labor.	Refrigerator Cars. Charge for Hrs.	Labor.
American continuous draft rods, one rod, welding	1	$0.20	1	$0.20
Arch bars, 1 or 2, replaced on same side of truck	3	.60	3	.60
Arch bar, blacksmith shop labor, repairing	2	.40	2	.40
Axle, bent, straightening	4	.80	4	.80
Bolster, body, composite, one, replaced	10	2.00	12	2.40
Bolster, body, plain metal or wood, one, replaced	8	1.60	10	2.00
Bolster, body, plain metal or wood, one, replaced when one or more defective sills are replaced	2	.40	2	.40
Bolster, composite, one, replaced when one or more defective sills are replaced	4	.80	4	.80
Bolster, truck, one, replaced	10	2.00	10	2.00
Bolster, truck, one, and one spring plank in same truck, replaced	12	2.40	12	2.40
Brake beam, one, replaced	2	.40	2	.40
Brake beam, one, metal, blacksmith labor repairing	2	.40	2	.40
Buffer blocks, cast iron, each, replacing	1	.20	1	.20
Buffer blocks, wooden, replacing at one end of car	2	.40	2	.40
Carlin, one, replaced	3	.60	..	....
Center pin head applied, empty car	½	$0.10	½	$0.10
" " " " loaded car	2	.40	2	.40
" " key " empty car	1½	.30	1½	.30
Center plate, one, replacing	2	.40	2	.40
Center plates, two, replacing at same end	3	.60	3	.60
Center plate bolts, replacing, in part or all at one end	3	.60	3	.60
Center plate bolt or bolts and center plate, replacing on one end of car	3	.60	3	.60
Column bolts, one or more, replaced in same truck	2	.40	2	.40
Corner iron, one, replaced	1	.20	1	.20
Corner post, one, replaced	3	.60	6	1.20
Coupler stops, all, at one end of car, replaced	3	.60	3	.60
Coupler stops, one or two, at same end of car, replaced	2	.40	2	.40
Coupler, with stem attachments, coupler springs, one or more follower plates, American continuous draft key, American continuous draft rods, one or two coupler stops, coupler pocket, coupler pocket rivets, renewing or replacing any or all, at same end of car, at same time	2	.40	2	.40
Coupler, with pocket attachments, as above.	3	.60	3	.60
Cross tie timber, one, replaced	3	.60	3	.60
Cross tie timber, one, replaced when one or more defective sills are replaced	1	.20	1	.20
Door, end, old, rehanging	½	.10	..	....
" side, " "	1	.20	1	.20
Door post, one replaced	3	.60	6	1.20
Draft timber, one, replaced	6	1.20	6	1.20
Draft timber, one, replaced when its center sill has been replaced	1	.20	1	.20
Draft timbers, two, on same end, replaced	9	1.80	10	2.00
Draft timber bolts complete at one end of car, replacing	3	.60	3	.60
Draft timber bolts, three or less at one end of car, replacing	2	.40	2	.40
Draft timber bolts, four or more at one end of car, replacing	3	.60	3	.60
End plank, one, renewed on gondola car	2	$0.40	..	....
End planks, two, renewed on same end	2½	.50	..	....
End planks, three, renewed on same end	3	.60	..	....
End planks, four, renewed on same end	3½	.70	..	....
End plate, one, replaced	12	2.40	14	$2.80
End post, one, replaced	3	.60	6	1.20
Journal box, one, replaced	2	.40	2	.40
" boxes, two, on same axle, replaced	3	.60	3	.60
Journals, truing up one or two, on same axle	2	.40	2	.40
Platform plank, one, replaced	1	.20	1	.20
Releasing rod for M. C. B. coupler, one, replaced	½	.10	½	.10
Running board, complete, applied	6	1.20	6	1.20
Spring plank, one, replaced	10	2.00	10	2.00
Side plank, one, renewed on gondola car	4	.80	..	....
Side planks, two, renewed on same side	5½	1.10	..	....
Side planks, three, renewed on same side	7	1.40	..	....
Side planks, four, renewed on same side	8½	1.70	..	....
Side plate, one, applied	25	5.00	35	7.00
" plate, one, spliced	8	1.60	15	3.00
" post, one, replaced	3	.60	6	1.20
SILLS.				
1 center sill, replaced	32	6.40	44	8.80
2 center sills, replaced	38	7.60	65	13.00
1 end sill under siding, replaced	15	3.00	15	3.00
1 end sill outside siding, replaced	7	1.40	7	1.40
1 end sill under siding, replaced when one or more defective sills have been replaced	3	.60	3	.60
1 end sill outside siding, replaced when one or more defective sills have been replaced	2	.40	2	.40
1 intermediate sill, replaced	29	5.80	40	8.00
2 " sills, "	35	7.00	56	11.20
3 " " "	41	$8.20	66	$13.20
4 " " "	47	9.40	76	15.20
1 inter. sill and 1 center sill replaced	38	7.60	60	12.00
1 " " " 2 " sills "	44	8.80	81	16.20
2 " sills " 1 " sill "	43	8.60	70	14.00
2 " " " 2 " sills "	50	10.00	91	18.20
3 " " " 1 " sill "	48	9.60	80	16.00
3 " " " 2 " sills "	60	12.00	101	20.20
4 " " " 1 " sill "	60	12.00	90	18.00
4 " " " 2 " sills "	65	13.00	111	22.20
1 intermediate sill, spliced	11	2.20	14	2.80
1 side sill and 1 center sill replaced	48	9.60	65	13.00
1 " " " 2 " sills "	53	10.60	86	17.20
2 " sills " 1 " sill "	68	13.60	86	17.20
2 " " " 2 " sills "	71	14.20	107	21.40
1 " sill spliced	12	2.40	15	3.00
1 " " replaced	25	5.00	44	8.80
2 " sills "	40	8.00	65	13.00
1 " sill and 1 inter. sill replaced	44	8.80	60	12.00
1 " " " 2 " sills "	50	10.00	70	14.00
1 " sill " 3 " " "	56	11.20	80	16.00
1 " " " 4 " " "	62	12.40	90	18.00
2 " sills " 1 " sill "	58	11.60	81	16.20
2 " " " 2 " sills "	64	12.80	91	18.20
2 " " " 3 " " "	70	14.00	101	20.20
2 " " " 4 " " "	76	15.20	111	22.20
1 side, 1 inter. and 1 center sill replaced	53	10.60	81	16.20
2 " 1 " " 1 " " "	74	14.80	102	20.40
1 " 2 " " 1 " " "	58	11.60	91	18.20
2 " 2 " " 1 " " "	76	15.20	112	22.40
1 " 3 " " 1 " " "	63	12.60	101	20.20
2 " 3 " " 1 " " "	81	16.20	122	24.40
1 " 4 " " 1 " " "	68	13.60	111	22.20
2 " 4 " " 1 " " "	86	17.20	132	26.40
1 " 1 " " 2 " sills "	58	11.60	102	20.40
2 " 1 " " 2 " " "	76	15.20	123	24.60
1 " 2 " " 2 " " "	63	12.60	112	22.40
1 " 3 " " 2 " " "	69	13.80	122	24.40
1 " 4 " " 2 " " "	74	14.80	132	26.40
2 " 2 " " 2 " " "	81	16.20	133	26.60

2 " 3 " " 2 " " "	86	17.20	143	28.60
2 " 4 " " 2 " " "	91	18.20	153	30.60
Each side or inter. sill spliced, when other sills have to be replaced, as above.....	6	1.20	7	1.40
An additional charge of 75 cents shall be allowed in replacing intermediate or center sills on cars equipped with air brakes.				
Truck spring, one, replaced.....	2	$0.40	2	$0.40
Truck transom, one, wood, replaced.....	10	2.00	10	2.00
Truck transoms, two, wood, replaced in same truck.....	12	2.40	12	2.40
Weighing and re-stenciling car, per rule 70.	½	.10	½	.10
When necessary to remove load to replace body center plate and bolt or bolts, draft timber bolts, at one end of car.....	2	.40	2	.40

RULE 105. No charge to be made for labor of replacing or applying M. C. B. knuckles, knuckle pins, locking pins, clevises, clevis pins, lift chains, brake shoes or brake shoe keys, except on the authority of a defect card.

RULE 106. When it is necessary to apply an M. C. B. coupler complete, on account of a broken or missing knuckle, the usual labor charge for replacing a coupler can be made.

RULE 107. No additional labor to be charged for applying center pin or friction rollers when center plate bolts or center plates are renewed on same end of car.

RULE 108. No additional labor to be charged for renewing head blocks or buffer blocks if end sill at same end is renewed or replaced.

RULE 109. The following table shows the labor charges allowable, in cents, for the items named in air brake work.

A key to schedule of prices, covering the determination of prices involved in any piece of work, precedes the table showing the labor charges allowable. The letters "R. & R." in this key mean "removed and replaced."

KEY TO SCHEDULE OF PRICES.

	Cents.
Cap screws or studs or bolts, R. & R., each.....	1
Cylinder cleaning, testing and stenciling.....	13
Emergency valve seat, R. & R.....	5
Graduating stem nut, R. & R.....	2
Lag or wood screws, R. & R., each.....	1
Nuts tightened when loose, each.....	1
Nuts ⅞ inch or less, R. & R., 1 or 2 on same bolt.....	1
Nuts ⅞ inch or over, R. & R., 1 or 2 on same bolt.....	2
Pins connecting, R. & R. (including split key).....	2
Pins riveted, R. & R., each.....	3
Plugs oil, R. & R., each.....	1
Release valve, R. & R., each.....	2
Spring cotters, R. & R., each.....	1
Staples, R. & R., each.....	1
Testing air (after repairs).....	5
Threads on pipe, cutting, per coupling.....	5
Train or branch pipe disconnected and connected, or only connected, each connection.....	3
Triple valve, cleaning, testing and stenciling.....	6
Union disconnected and connected.....	2

The labor charges allowable (in cents) are as follows:

	Cents.
Air hose, R. & R.....	3
Angle cock, R. & R.....	6
Angle cock handle, R. & R.....	6
Check valve case, spring, gasket, or all, R. & R.....	9
Coupler, dummy, R. & R.....	1
Cut-out cock, R. & R.....	8
Cut-out cock handle, R. & R.....	3
Cylinder, R. & R.....	27
Cylinder and reservoir, R. & R.....	36
Cylinder and reservoir, tightening when loose.....	8
Cylinder, cleaned, oiled, tested and stenciled.....	20
Cylinder release spring, R. & R.....	8
Cylinder gasket, R. & R.....	20
Gasket, coupling, R. & R.....	2
Graduating nut, stem, spring, or all, R. & R.....	2
Oil plugs, R. & R.....	2
Packing leather expander, R. & R.....	7
Pipe, securing to body, R. & R., for each staple.....	1
Pipe, train or branch, for each connection made.....	3
Piston, R. & R.....	12
Piston packing leather, R. & R.....	11
Pressure retaining valve, removed, repaired and replaced	10
Push rod, R. & R.....	2
Release valve, R. & R.....	4
Release valve, removed, repaired and replaced.....	9
Release valve rod, removed, repaired and replaced.....	2
Reservoir, R. & R.....	25
Strainer, R. & R.....	5
Triple cylinder cap gasket, R. & R.....	3
Triple emergency valve seat, R. & R.....	9
Triple piston packing ring, fitted.....	15
Triple slide valve, removed, ground in and replaced...	33
Triple valve, removed, cleaned, oiled, tested and stenciled	24
Triple valve gasket, R. & R.....	8
Unions, disconnected and connected.....	2

RULE 110. The settlement prices of new eight wheel cars shall be as follows, with an addition of $27.50 for each car equipped with air brakes. The road destroying a car with air brakes may elect to return the air brake apparatus, including such attachments as are usually furnished by the air brake manufacturer, complete and in good condition:

BODIES.

Wood or Iron.

Box car, eight wheel, 40 feet long or over.....	$400.00
Box car, eight wheel, 36 feet long or over, but under 40 feet.....	350.00
Box car, eight wheel, 34 feet long or over, but under 36 feet long.....	325.00
Box car, eight wheel, 32 feet long or over, but under 34 feet long.....	300.00
Box car, eight wheel, under 32 feet long.....	240.00
Box car, ventilated, eight wheel, 40 feet long or over	425.00
Box car, ventilated, eight wheel, 36 feet long, but under 40 feet.....	375.00
Box car, ventilated, eight wheel, 34 feet long, but under 36 feet.....	350.00
Flat car, eight wheel, plain, 40 feet long or over.....	180.00
Flat car, eight wheel, plain, 32 feet long or over, but under 40 feet.....	140.00
Flat car, eight wheel, plain, under 32 feet long.....	100.00
Gondola car, eight wheel, drop bottom, 40 tons capacity or over.....	300.00
Gondola car, eight wheel, drop bottom, 30 tons capacity or over, but under 40 tons.....	275.00
Gondola car, eight wheel, drop bottom, 25 tons capacity or over, but under 30 tons.....	250.00
Gondola car, eight wheel, drop bottom, 20 tons capacity or under.....	180.00
Gondola car, eight wheel, hopper bottom, 50 tons capacity	400.00
Gondola car, eight wheel, hopper bottom, 40 tons capacity or over, but under 50 tons.....	325.00
Gondola car, eight wheel, hopper bottom, 30 tons capacity or over, but under 40 tons.....	300.00
Gondola car, eight wheel, hopper bottom, 25 tons capacity or over, but under 30 tons.....	265.00
Gondola car, eight wheel, hopper bottom, 20 tons capacity or less.....	200.00
Gondola car, eight wheel, plain, 40 tons capacity and over	275.00
Gondola car, eight wheel, plain, 30 tons capacity, but under 40 tons.....	250.00
Gondola car, eight wheel, plain, 25 tons capacity, but under 30 tons.....	225.00
Gondola car, eight wheel, plain, under 25 tons.....	125.00
Stock car, eight wheel, 34 feet long or over.....	300.00
Stock car, eight wheel, 32 feet long or over, but under 34 feet.....	275.00
Stock car, eight wheel, under 32 feet long.....	240.00

The lengths of cars above mentioned refer to the lengths over the end sills.

When cars of 60,000 pounds capacity or over, and so stenciled, have trucks with journals 4 inches or over in diameter when new, $40 per car shall be added to the figure as given above for the values of car bodies, when equipped with metal bolsters.

TRUCKS.

50,000 lbs. capacity, with metal transoms and wooden bolster, per pair	$175.00
60,000 lbs. capacity or under, with wood bolster, per pair	175.00
60,000 lbs. capacity or under, all metal, per pair	260.00
80,000 lbs. capacity or under, but over 60,000 lbs., all metal, per pair	325.00
100,000 lbs. capacity or under, but over 80,000 lbs., all metal, per pair	350.00

Prices include brake beams complete, truck levers, dead lever guides and bottom connection rods.

FOUR WHEEL CARS.

Coal car, ordinary, complete	$200.00
Box car, complete	230.00
Gondola car, drop bottom, complete	300.00

RULE 111. Depreciation due to age shall be estimated at six per cent per annum upon the yearly depreciated value of the bodies and trucks only; provided, however, that allowances for depreciation shall in no case exceed sixty per cent of the value new. The amount, $27.50, for air brakes shall not be subject to any depreciation.

RULE 112. Refrigerator cars, special stock cars, tank cars, except the tanks, and other freight cars, designed for special purposes, not referred to above, shall be settled for at the present cost price, as may be agreed to by the parties in interest, less the deduction for depreciation due to age, which shall be on the same basis as for regular freight equipment.

RULE 113. In rendering bills, cars shall be treated as belonging to companies or individuals whose name or initials they bear, except in case of Line Cars, where the equipment list of the general officers of the Line designates a party to make settlement.

RULE 114. Switching roads will only be allowed to render bills against car owners for the following defects repaired by them: Roof lost on account of decay or faulty construction, wornout brasses, broken truck springs, truck transoms, arch bars, draft timber bolts, column bolts, truck hangers, truck transom truss rods, truck bolsters, truck bolster truss rods, oil boxes, spring planks, truck hanger pins, side bearings and center plates, center plate bolts, center pins, followers, American continuous rods or keys, draft springs, couplers and knuckles, provided the damage has not been caused by derailment or rough usage. They will be allowed to render bills direct against car owners on all car owners' defects on cars received by them from a railroad company, provided they procure joint evidence from the delivering road that such car owners' defects existed when the car was delivered by the railroad company, joint evidence to accompany the bill against the car owner.

RULE 115. A switching road is a corporation doing the major part of its business on a switching charge, or one which does not pay mileage for handling cars.

RULE 116. Bills may be rendered against car owners for the cost of applying temporary running boards and hand rails to make cars safe for trainmen.

DESTROYED CARS AND THE RETURN OF TRUCKS.

RULE 117. The company on whose line the bodies or trucks are destroyed shall report the fact to the owner immediately after their destruction, and shall have its option whether to rebuild or settle for the same.

RULE 118. If the company on whose lines the car is destroyed elects to rebuild either body or trucks, or both, the original plan of construction must be followed, and the original kind and qualities of materials used. The rebuilding must be completed within 60 days from the original date of damage or destruction. In such cases no allowance shall be made for betterments.

RULE 119. If only the body of a car is destroyed, and the company destroying it elects to return the trucks, they shall be put in good order, or accompanied by a defect card, covering all defects or improper repairs made by them for which owners are not responsible, and forwarded, within 60 days, free of freight or other charges, to the nearest point on the line of the company owning or operating the car, and the number, line and class of car destroyed shall be stenciled or painted on each truck so returned.

RULE 120. The company on whose line the body or trucks of a car are seriously damaged, but not destroyed, may notify the owner and ask an appraisement on the damage done to the car as a basis for the disposal of the damaged car.

RULE 121. For the mutual advantage of railway companies interested, the settlement for a car owned or controlled by a railway company, when damaged or destroyed upon a private track, shall be assumed by the railway company delivering the car upon such tracks.

SENDING HOME WORNOUT AND DAMAGED CARS.

RULE 122. A car unsafe to load on account of general wornout condition, due to age or decay, shall be reported to its owner, who must be advised of all existing defects. If the owner elects to have it sent home, he shall furnish two home cards, noting upon them existing defects and the route over which the car is to be returned to its owner. If the route coincides with that over which the car passed to the point where it became unserviceable, no liability shall be incurred as between the owner and the road handling the car, either for freight charges in handling the car or for car service during this movement.

Such cards shall be attached to each side of the body of the car. They shall be 3½ by 8 inches, and of the form shown below. They shall be printed on both sides, and shall be filled in on both sides with ink or black indelible pencil:

FROM ..... R. R.
TO ..... R. R.
VIA .....
.....
Car No .....Initials .....
To be shopped for .....
.....
.....
(Head of Car Department.)

RULE 123. A car which is safe to run, but unsafe to load on account of serious damage caused by wreck or accident, shall be reported to the owners for appraisement and disposition, and disposed of as provided in Rule 122, if the owner so elects.

RULE 124. In case of cars of private ownership sent home on account of general wornout condition, due to age or decay, such cars shall be entitled to as many miles of homeward movement, free of charge to owners, as they may have been handled over said line under load, and no mileage to be paid to owners by roads handling. If the haul necessary to get cars home is in excess of such loaded mileage, said excess will be billed against the owner at regular freight rates and the owner notified.

RULE 125. Private line cars sent home to owners on account of being wrecked or damaged in accident shall be regularly billed home free of charge to owners, and owners notified, providing such homeward movement passes over roads which have handled the cars loaded, previous to their homeward empty movement; otherwise the damaged cars to travel home empty, free of charges and free of mileage, according to home route; or, if owners prefer to have them

billed home via direct line, then charges to accrue to such line over which cars were not entitled to free movement.

FURNISHING MATERIALS.

RULE 126. Companies shall promptly furnish to each other, upon requisition, and forward free over their own road, material for repairs of their cars injured upon foreign lines that cannot be procured in open market. Requisition for such material shall state that it is for repairs of cars, and shall give the number and lettering of such cars and pattern number of castings required when possible.

CONDITIONS OF ACCEPTANCE OF THIS CODE.

RULE 127. Any car owner or railway company may become a party to this Code of Rules by giving notice through one of its general officers to the Secretary of the Master Car Builders' Association.

Railroad companies becoming subscribers to this Code of Rules must have a representative member in the Master Car Builders' Association.

RULE 128. Any car owner or railway company that is a party to this Code of Rules shall be bound by same through its successive revisions until one of its general officers files with the Secretary of the M~ster Car Builders' Association its notification of withdrawal.

RULE 129. Acceptance or rejection of this Code of Rules must be as a whole, and no exception to an individual rule or rules shall be valid.

SETTLEMENT OF DISPUTES.

RULE 130. In order to settle disputes arising under the rules, and to facilitate the revision of the rules at the annual conventions of the Association, an Arbitration Committee of five representative members shall be appointed annually by the Executive Committee; three members of this committee to constitute a quorum.

In case of any dispute or question arising under the rules between the subscribers to said rules, the same may be submitted to this committee through the secretary, in abstract, jointly, said abstract setting forth the point or points at issue, and each party's interpretation of the rules upon which its claim is based, clearly and concisely, not exceeding three type-written pages of letter size, single space, which shall be signed by both parties to the dispute. Should one of the parties refuse or fail to furnish the necessary information, the committee shall use its judgment as to whether, with the information furnished, it can properly give its opinion. The decisions of the committee shall be final and binding upon the parties concerned. This committee shall report its decisions to the Association, and its report shall be incorporated in the annual report of proceedings of the Association.

REVISION OF THIS CODE OF RULES.

RULE 131. The Arbitration Committee shall ask for suggestions of changes, amendments and additions to these rules prior to each annual convention, which it shall consider, and it shall report its recommendations to the succeeding annual convention.

RULE 132. In the revision of these rules by the Association a two-thirds vote shall be necessary for adoption.

RULE 133. Voting powers shall be the same as prescribed in the Constitution of the Master Car Builders' Association on matters pertaining to the adoption of standards and the expenditure of money.

RULE 134. This Code of Rules shall be introduced for the discussion and revision at one session of the Master Car Builders' Association convention each year.

RULE 135. This Code of Rules shall take effect September 1, 1902.

APPENDIX.

Code of Rules

Governing the Condition of and Repairs to Passenger Equipment Cars in Interchange.

1. Each railway company shall give to foreign cars, while on its line, the same care and attention that it gives its own cars, except in case of cars on which work is done under special agreement existing between the company owning the cars and the road operating the same.

2. Railroad companies handling cars are responsible for damage to any car by unfair usage, derailment or accident, and for improper repairs made by them, and they should make proper repairs at their own expense or issue defect card covering all such damage or improper repairs.

3. Cars must be delivered in good running order, and returned in as good general condition as when received.

4. The receiving road is authorized to make such alterations and repairs as are necessary for the safe movement of cars over its line, and must immediately notify the delivering road of all such alterations and repairs, upon receipt of which notification the delivering road shall furnish proper authority to render bill for such alterations and repairs.

5. Authority must be furnished for the replacement of wheels and axles if in the following condition:

WHEELS.

(*a*) Loose wheels.

(*b*) Variation from gage beyond the limits as prescribed in the Rules of Interchange for freight cars.

WHEELS, CAST IRON.

(*a*) Shelled out, with treads defective on account of circular pieces shelling out, leaving round, flat spots, deepest at the edges, with raised centers, if 1¼ inches or more in diameter.

(*b*) Tread worn hollow; if tread is worn sufficiently hollow to render flange or rim liable to breakage.

(*c*) Worn flange; flanges having flat, vertical surfaces, extending more than ¾ inch from tread.

(*d*) Flat spots; if flat spots, caused by sliding, exceed 1¼ inches in length.

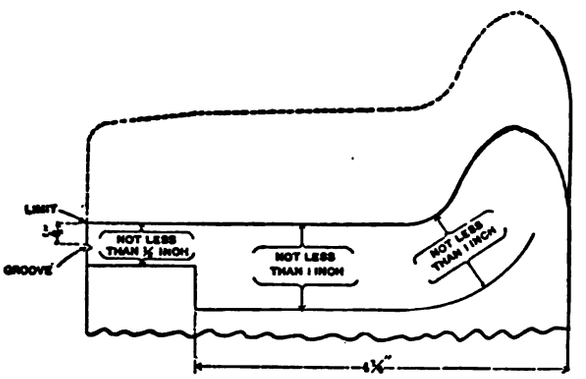
(*e*) Burst; if wheels are cracked from the wheel fit outward by pressure from the axle.

(*f*) Flanges, rim, tread, plate or brackets, either cracked, chipped or broken in any manner.

WHEELS, STEEL TIRED.

(*a*) Loose, broken or cracked hubs, plates, bolts, retaining ring or tire.

(*b*) Worn flange or tire; with flanges less than ¾ inch thick, or having flat, vertical surfaces extending more than ¾ inch from tread, or with tire thinner than shown



(*c*) Flat spots; if flat spots, caused by sliding, exceed 1¼ inches in length.

AXLES.

Axles bent or broken, or having journals cut or less than 3½ inches in diameter.

BRAKES.

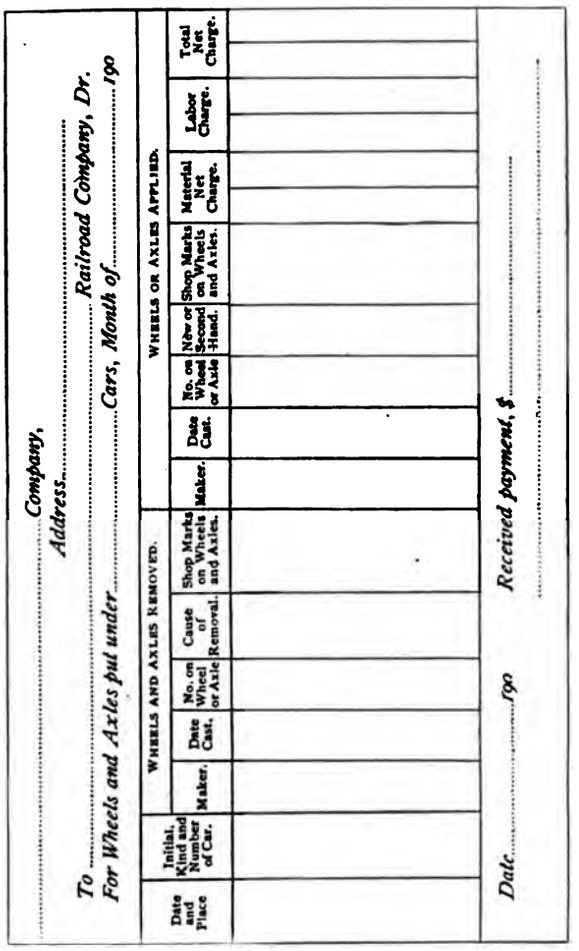
6. Brakes must be in perfect working order. Cylinders must have been cleaned and oiled within six months, and the date of the last cleaning and oiling marked on brake cylinder and triple valve with white paint.

The adjustment of piston travel, based on seventy pounds as the initial pressure, must not be less than 5 inches nor more than 8 inches.

BILLS.

7. Bills for wheels and axles shall be of the following form, and must make specific mention of each wheel and axle removed or applied:

	New.	Second Hand.	Scrap.
1 36 inch cast wheel	$10.00	$7.50	$5.00
1 33 inch cast wheel	8.50	6.75	4.50
1 axle, 60,000 lbs	14.00	7.75	5.25
1 axle, 40,000 lbs	12.00	6.50	4.50



8. Bills rendered for labor and material furnished shall be in accordance with the following prices, with the proper debits and credits:

		New.	Credit for Scrap.
Journal Bearings	per lb.	16 cents	11 cents
Malleable Iron	"	3 "	½ "
Bolts, Nuts, Wrought Washers and all Wrought Iron, except Axles	"	3 "	¾ "
Castings	"	1¾ "	6-10 "
Spring Steel (not Springs)	"	4 "	¾ "
Lumber: Oak, Pine, Poplar, Hickory and Elm	per ft.	2½ "	
Labor		25c. per hour.	

All steel castings and steel wheels of the different makes to be charged at current market prices.

Removing, turning and replacing a pair of steel tired wheels, $7.

Removing and replacing a pair of cast iron wheels, $2.

Loss of service metal from steel tired wheels as a result of slid spots or other causes to be charged at the rate of $2 per 1-16 inch thickness of tire.

Glass, paints and other materials to be charged at current market prices.

GAS.

Debits and credits for gas shall be settled on the following basis:

Gas shall be charged at its current market price. No labor shall be charged for filling tanks.

If a car is transferred from the service of one railroad to that of another, the receiving road shall issue an M. C. B. defect card authorizing the delivering road to bill against it for the quantity of gas in the holders at the time car was received.

Cars in interchange requiring holders to be filled, the receiving road shall be charged for the quantity of gas supplied.

For cars stored in shop for repairs, the company having the car in its possession shall be responsible to the delivering company for the gas in the holders. This will apply to sleeping car companies when cars are in their possession and out of service.

INTERLOCKING BRAKE SHOE. FIGS. 999-1002. A form of brake shoe designed to be held in the brake shoe head until it is entirely worn out. The face of the shoe has pockets cast into it, into which fit the lugs on the back of the front shoe. When the shoe first applied is worn down thin it is removed and inserted in front of a new shoe applied to the brake shoe head. It then wears completely down, and the second shoe applied goes on taking the wear until it becomes thin, when it is placed in front, and so on. All that is not worn out are the lugs on the back of each shoe. Shoes for replacement and foreign equipment are plain faced and are similar in appearance to the ordinary forms.

INTERMEDIATE BRAKE LEVER FULCRUM. FIGS. 585-6. A fulcrum for the intermediate brake lever, attached to the sills of the car body.

INTERMEDIATE FLOOR (Passenger Cars). A floor consisting of boards placed between the sills and between the deafening ceiling, or under floor, and the upper or main floor. Its purpose is to exclude noise and cold. The tendency is to use no other deadening material in car floors.

INTERMEDIATE SILLS. 3, FIGS. 159-69, 360-72, etc. The two main longitudinal timbers underneath the floor between the side sills and the center sills.

INTERNAL CYLINDRICAL GAGE. A very accurately made, solid steel cylinder, used as a standard of measurement of cylindrical holes.

INTERNAL SCREW GAGE. A solid steel cylinder with a screw thread on it, for testing the diameter of female screws.

INVERTED ARCH BAR (Truck Side Frames). 15, FIGS. 3735-3951. A wrought iron or steel bar which rests on top of the journal boxes with the ARCH BAR, which see, on top of it. Also sometimes called the middle or lower arch bar, as in logging cars. See, CENTER BEARING INVERTED ARCH BAR (Six Wheel Trucks), 67, FIGS. 3735-3951.

INVERTED BODY QUEEN POST. A post in the side of a car body which supports the inverted body truss rod or overhang truss rod.

INVERTED BODY TRUSS ROD. A truss rod used as a HOG CHAIN, which see, to prevent the ends of a car body from sagging. It rests on two queen posts on top of the sill and is attached to the latter at each end, bearing against an inverted truss rod plate. An overhang truss rod.

IRON. See,

CARRY IRON.
CRICKET IRON.
KNEE IRON.
PULL IRON, or SWITCHING IRON, or ROPING STAPLE.
SAFETY BEAM IRON.
STEP IRON.
TRUCK FRAME KNEE IRON.
TRUSS ROD IRON.

IRON BODY BOLSTER. FIGS. 764, 780-82, etc. A BODY BOLSTER, which see, of iron, usually made in the form of a truss, consisting of two flat bars, the body bolster top plate and body bolster bottom plate. DOUBLE IRON BODY BOLSTERS, which see, are also used.

IRON TRUCK. A car truck of which the side frames are made wholly of iron. See, DIAMOND TRUCK, which is the principal type. These are often made of iron with wooden transoms and spring planks, although iron transoms are now used in many cases. See also, FIGS. 3940-42.

ITALIAN HEMP BELL CORD. See, BELL CORD.

J

JACK. See, JACK SCREW. BALL BEARING JACK, FIGS. 2972-77. HYDRAULIC JACK, FIGS. 2978-82, 2986. LAMP JACK. LEVER RACK JACK. SCREW JACK, FIGS. 2970-77. SMOKE JACK. STOVE PIPE JACK. VENTILATOR JACK. Etc.

JACK ARMS (Steam Shovel). 29, FIGS. 357-59.

JACK SCREW. FIGS. 2970-77. 1. A tool or machine for lifting or raising heavy weights. It consists of one or more screws, turned by a lever and working in a case, which rests upon the floor or ground, as shown in the figure.

Jacks take various names from their forms, sizes and shapes, and are designated as bell base, broad base, claw, and low, and also from the uses for which they are designed, as journal box jacks, traversing jacks, track jacks, etc. See, HYDRAULIC JACK.

2. (Pile Driver Car and Steam Shovel.) 30, FIGS. 357-59. A jack screw working on a jack screw pin attached to the body, for relieving the springs of the cars from action and making the platform a rigid body. Tongs or crabs attached to the track are used to prevent the car body from rising upward when on the jack screws. Another device for this same purpose is a bolster jack screw.

JACKETS FOR STEAM HEATING (Safety's). FIGS. 2401-10. The figures show in detail the construction of the single jackets, anti-hammering jackets and double jackets, respectively. The inner or the water circulation pipes are of brass or copper, and therefore most efficient conductors of heat. Leakage of steam from steam spaces past the water pipes is prevented by packed glands shown.

JACQUEMIN GRAIN DOOR. FIGS. 1138-41.

JAM NUT (Engineer's Valve). 6, FIGS. 907-09.

JAM NUT (Pump Governor). 9, FIGS. 963-64.

JAMB (of a Door). The door post on each side of the door proper. ASH PIT JAMB, which see, is a similar use of the term.

JANNEY-BUHOUP 3-STEM PLATFORM EQUIPMENT. FIGS. 1526-1630. An improved form of the Janney draft gear for passenger cars. The coupler head is connected to the center stem and the two side stems and its movement out of the center line of the car is resisted by the side stem springs. The center stem is backed up by the draft spring proper which is held in a pocket between the sills and which absorbs most of the shocks. The buffer plate is backed up by two buffer stem springs which aid in absorbing buffing shocks.

JANNEY CAR COUPLER. FIGS. 1380-91. A drawbar arranged to couple cars automatically, invented and patented by E. H. Janney in 1870. The outer end of the drawbar is made of a forked or U-shape, and to one arm an L-shaped knuckle is pivoted. When the two drawbars come together, the two knuckles engage into each other. The axis of the drawbar therefore remains always fixed, and does not move sidewise to couple as in the Miller coupler.

In the passenger coupler, when the knuckles engage, the rear point of one or both of them is thrown back, and in its rearward motion it displaces a catch, which snaps back over the point of hook and secures it in place. The motion of the catch is controlled by the catch spring, which slides on the catch spring bolt. The drawbar is cast hollow to contain the knuckle, catch and attached parts.

To uncouple, a platform lever draws a pull rod which operates a catch lever and unlocks the knuckle, permitting the same to swing upon the knuckle pin.

JANNEY FREIGHT COUPLER. FIGS. 1380-91. One of the M. C. B. automatic couplers, with a gravity lock.

JANNEY-MILLER COUPLER. A modification of the Janney coupler, so as to enable it to be rapidly changed into an equivalent of the Miller coupler, thus enabling cars provided with it to be run in connection with either Janney or Miller draw gear. The principal changes to effect this end were as follows:

A joint was made in the barrel of the ordinary Janney coupler to provide for the removal of the head when it was desired to change to the Miller. There was added the part called the center buffer yoke, in order to provide a connection between the center buffer spring and center buffer when used as a Miller coupling, the same springs being used, whether in use as a Janney or as a Miller coupler.

A spiral spring called the side spring, with its bracket and clevis, was added to give the necessary side resistance to the Miller hook. The platform lever was lengthened for the purpose of conforming to the difference in heights between the Janney catch lever and the chain by means of which the Miller hook is moved in uncoupling, the same lever serving for either draw gear. Followers and guides were provided and placed back of the center buffer spring to form a better base for that spring when used in connection with the Miller buffer. The Miller stop was added to the Janney platform. After a little practice the change from the Miller to the Janney gear was made in from two to five minutes. Superseded almost entirely by more modern platform equipments using only M. C. B. couplers.

JAW. A PEDESTAL JAW, which see.

JAW BIT. A bar extending across the mouth of a pedestal jaw underneath a journal box and bolted to the horns of the pedestal.

JAW BOLT. A bolt with a U-shaped split head, perforated to carry a pin. Used largely as a brake lever fulcrum on brake beams.

JAW SPRING. A JOURNAL SPRING, which see.

JENINGS REFRIGERATOR. FIGS. 199-205. A system of refrigeration in which the ice tanks and interior fittings of the car are collapsible and readily folded out of the way when ice is not required, increasing the capacity of the car.

JIB (of a Derrick or Crane). More properly BOOM, which see.

JOINT. See, HEAD JOINT. SCARF JOINT. THREE WAY JOINT.

JOINT BOLT. FIG. 3280. A bolt used for fastening two timbers when the end of one joins the side of another. The lug bolt is another form for the same purpose.

JOINT COVER. See, WINDOW MOLDING JOINT COVER.

JOINT STRIP (of Winslow Roof). 1, FIGS. 1714-26. A strip of wood with rabbeted grooves for inserting the corrugated roof sheets. A cover strip is a U-shaped strip of metal for uniting flat roof sheets.

JONES CAR DOOR. FIGS. 1055-56.

JOURNAL. The part of an axle or shaft on which the journal bearing rests. A gudgeon is a rough form of journal, usually of wood with an iron strap around it, as for the mast of a derrick or crane. The journals of bodies of irregular shape, like cannon or leaders of pile driver cars, are more commonly designated TRUNNIONS, which see. See below.

JOURNAL BEARING. FIGS. 4091-99. A block of metal, usually some kind of BRASS or BRONZE, which see, in contact with a journal, on which the load rests. In car construction the term when unqualified means a car axle journal bearing. A standard form has been adopted by the Master Car Builders' Association, but its composition is not specified. The Hopkins or lead lined journal bearing is one coated on the inside with a thin sheet of lead to make it self fitting on journal. Babbitt metal in some of its many forms is used for car journal bearings occasionally, and almost universally for the bearings of machinery. In order that the journal bearing may be more easily removable, and to distribute the load more equally, a journal bearing key, also called a wedge, etc., is used to hold the journal

bearing in place. The term "wedge" is in very common use, perhaps more common than the name here given.

JOURNAL BEARING AND WEDGE GAGE. FIGS. 4556-75. In 1894 a Recommended Practice was adopted for gages for journal bearings and wedges, to insure their proper interchangeability and freedom from binding when in place. The set comprises:

Two bearing and wedge cross section gages.
" " " " longitudinal section gages.
" " flanged side lug gages.
" " bore gages.
One " thickness gage, common to both sizes.

In 1898 the radius of both bearing bore gages was reduced 1-32 inch on drawing to correspond strictly with M. C. B. Standards shown in FIGS. 4244-60, 4267-83.

JOURNAL BEARING KEY OR WEDGE. M. C. B. Standard, FIGS. 4275-79, 4244-48. See above.

JOURNAL BEARING STOP KEY. A journal bearing key with a projection to which a stop plate is attached to restrain lateral play, so that a collar on the axle may be dispensed with.

JOURNAL BOX. 165, FIGS. 159-69 and 3, FIGS. 3735-3951; FIGS. 4100-4122. A cast iron box or case which incloses the journal of a car axle, the journal bearing and key, and which holds the packing for lubricating the journal. Also called an axle box, car box, grease box, housing box, oil box, and pedestal box. English, usually axle box.

All car journal boxes are outside bearing. In certain larry or push cars, and also in locomotive trucks, inside bearing journal boxes are used. To dispense with the need of a collar on the axle, various devices, like the stop key and stop journal bearings, have been introduced, but they are now seldom used.

JOURNAL BOXES AND DETAILS (M. C. B. Standard).

(For Journals 3¼ in. x 7 in.). FIGS. 4238-60. The journal box and details as shown in these drawings were adopted as standards of the Association, by letter ballot, in 1893, and revised in 1894 and 1896. For former action, see Proceedings 1874, page 40; Proceedings 1881, pages 14, 15 and 27.

The revision made in 1894 consisted in correcting the drawing at the top of the journal box, and in leaving off the lugs at sides of arch bars. Also in changing the wedge and bearing so as to make the latter flat on top instead of curved, as theretofore, and in curving the top of the wedge, thus making this construction similar in general arrangement to the standard forms for the 4¼ by 8 inch journal box.

The revision made in 1896 consisted in the elimination of the dust guard from Sheet 1, and the addition of notes providing that any suitable dust guard might be used, and that a rivet or nut might be used instead of the cotter, if preferred, in the hinge pin of the lid. Also in the addition to Sheet 3 of a similar note to the latter, and of notes concerning the lid spring and the wedge. At the same time the side lugs on the brass were increased so as to measure 1⅛ inches long instead of 1 inch long as they were formerly.

One additional note was made on Sheet 1 and two additional notes on Sheet 2 in 1898.

In 1899 the size of bolt hole was increased from 1 inch to 1 1-16 inches.

(For Journals 4¼ by 8 in.). FIGS. 4261-83. The journal box and details as shown in these drawings were adopted as standards of the Association, by letter ballot, in 1893, and revised in 1896. For former action see Proceedings 1891, pages 142-144.

The revision made in 1896 consisted in the elimination of the dust guard from Sheet 4; also, in removing the arch bar seat lugs from Sheets 4 and 5, and making the arch bar seat 4½ inches wide. Also, in the addition to Sheet 4 of notes providing that any suitable dust guard might be used, and that a rivet or nut might be used instead of a cotter, if preferred, in the hinge pin of the lid. Also, in the addition to Sheet 6 of a similar note to the latter, and of notes concerning the lid spring and the wedge. At the same time the side lugs on the brass were increased so as to measure 1⅛ inches long instead of ¾ inch long as they were formerly.

One additional note was made on Sheet 4 and two additional notes on Sheet 5 in 1898.

The revision in 1901 consisted of cutting out entirely the inner dust guard wall at the top.

(For Journals 5 x 9 in.). FIGS. 4373-90, 4400-27. The journal box and details shown in these drawings were adopted as Recommended Practice in 1896. In 1898 they were adopted as standards of the Association.

In 1900 the opening at the back end of box, corresponding with the dust guard, was increased from 3 3-16 inches to 3⅜ inches radius, making the opening 6¾ inches wide instead of 6⅜ inches, the height remaining unchanged.

The revision in 1901 consisted of cutting out entirely the inner dust guard wall at the top.

In 1902 the wedge stop lugs were increased in size and extended laterally to the sides of box.

(For Journals 5½ in. x 10 in.). FIGS. 4391-4424. The journal box and details shown in these drawings were adopted as standard in 1900.

In 1901 the inner dust guard wall at the top was cut out entirely to avoid all danger of the journal bearing striking the wall of the box at the rear.

In 1902 the wedge stop lugs were extended laterally to the sides of box.

(For Passenger Car Journals 4¼ in. x 8 in.). FIGS. 4476-78. In 1898 a Recommended Practice was adopted for passenger car journal box and contained parts for journals 4¼ by 8 inches, and was formerly shown on Sheet G. In 1901, as a result of letter ballot, this was changed to Standard.

JOURNAL BOX BOLTS. 108, FIGS. 3735-53. The bolts on either side of the journal box which secure it between the arch bar and the pedestal tie bar.

JOURNAL BOX COVER, OR LID. 4, FIGS. 3735-3951. A door or lid covering an aperture on the outside of a journal box, by means of which oil and packing are supplied and journal bearings are inserted or removed. Such covers are made of cast iron, malleable iron, pressed steel, and sometimes of wood. They are usually closed by a spring.

JOURNAL BOX COVER BOLT. A bolt used to fasten covers which have no hinge to the box. Two of these are usually employed to each cover. A gasket of canvas, rubber or leather is used to make a tight joint. Journal box covers are, however, now almost invariably held on by hinges and springs or some arrangement of lugs or grooved joints.

JOURNAL BOX COVER HINGE PIN. FIG. 4117.

JOURNAL BOX COVER SPRING. A flat spring to hold the lid in place.

JOURNAL BOX GUIDES. Iron bars or blocks placed one on each side of the journal boxes of some iron frame trucks in which journal springs are used. These irons, while holding the box in place longitudinally and transversely, allow it to have a vertical motion between them. When a pair of these guides is cast in one piece it is called a PEDESTAL, which see.

JOURNAL BOX JACKS. FIGS. 2981, 2986. A low jack specially designed to set under journal boxes, and take the weight off the journal, so that brasses can be removed as from a hot box.

JOURNAL BOX LID. See, JOURNAL BOX COVER.

JOURNAL BRASS. A JOURNAL BEARING, which see.

JOURNAL PACKING. Waste, wool, or other fibrous material saturated with oil or grease, with which a journal box is filled to lubricate the journal. Various forms of patent packing have also been introduced.

JOURNAL SPRING. Shown in FIGS. 3757-59, 3774-77, etc. A spring supporting part of the weight of a car which is placed directly over the journal, and which usually rests on the journal box under the truck frame. Such springs are sometimes placed above the truck frame and supported by straps, and the weight of the car is transmitted to the journal box by a vertical pin or stirrup. EQUALIZER SPRINGS, which see, accomplish the same end in six wheel trucks as journal springs, and more effectually.

JUTE. A coarse fibre raised in India for making gunny bags, matting, ropes, etc. It has been recently used for making journal packing by a patented process.

K

KALAMINED IRON. Sheet iron, coated with an alloy of zinc, lead, tin and nickel in the proportion of 29 lbs. of tin, 50 to 75 lbs. of zinc, 100 lbs. of lead, and three to six ounces of nickel. The alloy melts at a lower temperature than common zinc, and is claimed to give a more durable compound as well as a thinner and more adhesive coating. Galvanized iron is sheet iron coated in the same way with pure zinc.

KEEPER. "A ring, strap, pocket, or the like device for detaining an object; as

1. "A jam nut.

2. "The box on a door jamb into which the bolt of a lock protrudes when shot, as FIGS. 1890-1900. When the keeper is for a beveled latch bolt, which is moved by contact with it, it is more commonly called a strike plate, as FIG. 1900. They are also further designated by the name of the lock or latch which they accompany.

3. "The latch of a hook, which prevents its accidental disengagement."—Knight.

KEEWANEE BRAKE BEAM. FIGS. 836-37. A steel brake beam of rectangular cross section, and a bar for truss rod, which is bent around the ends of the beam proper.

KEG SHAPED SPIRAL SPRING. A spiral spring, the form of which resembles a keg or cask. Its object is to obtain a GRADUATED SPRING, which see.

KELSO COUPLER. FIGS. 1371-79.

KERATOL. An artificial leather used for curtains and upholstering. It is made by coating a cloth fabric with a compound which gives it the appearance of leather.

KEY. 1. "In a general sense, a fastener; that which fastens; as a piece of wood in a frame of a building." —Webster. Hence a pin inserted in a hole in a bolt, and used to secure the bolt or its nut. A SPLIT KEY, which see, is a special form.

2. "An instrument for opening or shutting a lock by pushing the bolt one way or the other."—Webster. See, LOCK. BIT.

3. A block over the top of a journal bearing, called in full JOURNAL BEARING KEY, which see. This part is also very commonly called a wedge.

4. A beveled bar used with a gib to form a GIB AND KEY, which see. See also, KING BOLT KEY.

5. (For Lamps and Valves of Pintsch Gas Apparatus.) A substitute for the ordinary cocks of gas fixtures to prevent unauthorized tampering.

KEY BLOCK. 186, FIGS. 159-69. See, PACKING BLOCKS.

KEY BOLT. A bolt slotted near the end to receive a key, which takes the place of a nut.

KEY HOLE ESCUTCHEONS See, ESCUTCHEONS.

KEY HOLE PLATE. AN ESCUTCHEON OR ESCUTCHEON PLATE, which see.

KEY PIN (of a Lock). The pivot on which the key turns when inserted in the lock.

KEY RING TIRE FASTENING. A mode of securing the tire to the wheel, composed of two rings, one of U-section and the other nearly rectangular. The former ring holds tire and wheel together, and the latter ring holds the former in place, filling up the groove in the tire. When both rings are in place the outer lip of the groove in the tire is slightly hammered over, thus gripping the second or key ring, and retaining it in place. See also, TIRE FASTENING.

KEYSTONE CAR SEAL. FIGS. 3138-39.

KEYSTONE CAR WHEEL. FIGS. 4223-24.

KEYSTONE CAST STEEL BOLSTER. FIGS. 765-72. Body bolsters of cast steel made in one piece.

KEYSTONE PALACE HORSE CAR. See, STOCK CAR.

KICKING COIL. A coil of wire consisting of about ten turns wound on a wooden core; it is located in the feed circuit between lightning arrester and controller, and acts as an inductive resistance to the passage of lightning discharge through the apparatus. See, LIGHTNING ARRESTER.

KINDL TRUCK. FIGS. 3778-80. A pedestal truck of structural shapes reinforced somewhat after the manner of arch bar trucks.

KING BOLT, OR CENTER PIN. 18, FIGS. 159-69, 185-95; FIGS. 557-8. A large bolt which passes through the truck and body bolsters and center plates of a car body and the center of a truck. It is accessible from the floor of the car by removing the king bolt plate. The truck is supposed to swivel on the king bolt, but in reality the two center plates normally carry all the strain. In some wrecking cars the king bolt is provided with keys to bind the truck to the car so that they cannot be separated from each other.

KING BOLT KEY. FIGS. 625-7. See above.

KING BOLT PLATE. See above.

KING POST (of a Truss). A single post or distance piece between a truss rod and the chord of a truss or beam. If two such posts are used they are called queen posts. In car construction king posts are made in two ways: one adjustable, so that they may be lengthened or shortened, and the other without adjustment. Also see,

BRAKE BEAM KING POST. CROSS FRAME KING POST.
TRUCK BOLSTER KING POST. TRUCK FRAME KING POST.

KIRBY'S CAR DOOR LOCK. FIGS. 1980-81. A device to give a lock extra strength and durability and to dispense with the use of screws for fastening on the door knobs.

KIRBY'S SEAT LOCK. FIG. 3259.

KITCHEN (Dining Car). A large compartment at one end of the car provided with all the facilities of a well organized kitchen. Officers' and other private cars are commonly provided with a kitchen smaller than in dining cars and usually at the extreme end.

KNEE IRON. An L-shaped or angle iron casting or forging which is fastened to the corner where two timbers are joined to strengthen the joint. See, SILL KNEE IRON. TRUCK KNEE IRON.

KNOB. See, BERTH SAFETY ROPE KNOB. DOOR KNOB. WINDOW CURTAIN KNOB.

KNOB ESCUTCHEON. FIGS. 1983-87. A DOOR LATCH ROSE, which see.

KNOB SASH LIFT. See, SASH LIFT.

KNOB SHANK. FIG. 1980. A DOOR LOCK SPINDLE, which see.

KNUCKLE. 1. (M. C. B. Couplers.) FIGS. 1299-1499. The rotating coupling hook by means of which coupling is effected when the knuckle is locked by the catch or lock. It must conform to certain contour lines adopted by the M. C. B. Association in 1888 and shown in FIG. 4362.

2. (Of a Hinge.) FIGS. 1942-69. The central tubular projections which carry the hinge pin. The term is of wide and general application in mechanics to many similar parts.

KNUCKLE, AUTOMATIC COUPLER, CONTOUR LINE AND LIMIT GAGES. FIGS. 4355-56. Standard contour line was announced by Executive Committee under instructions from the Master Car Builders' Association April 8, 1888. Limit gages for preserving standard contour line were adopted in 1891.

These gages, properly proven by master gages, may be procured from Pratt & Whitney Company, of Hartford, Conn. A duplicate set of master gages is held in the office of the Secretary for reference when desired.

KNUCKLE JOINT. "A joint in which a projection on each leg or leaf of a device is inserted between corresponding recesses in the other, the two being connected by a pin or pivot on which they mutually turn. The legs of dividers and the leaves of door hinges are examples of true knuckle joints. The term, however, has been somewhat commonly restricted to compound or universal joints designed to act in any direction."—Knight. Among the applications of this joint which have been made in car building are gas pipe knuckle jointed tubes to be used instead of rubber for brake hose. They are not in general use.

KNUCKLE PIN (M. C. B. Coupler). 16, FIGS. 1526-1613. The steel pin connecting the knuckle to the jaws of the coupler.

KRUPP SAFETY LOCK (Steel Tired Wheels). FIG. 4226.

KRUPP STEEL TIRED CAR WHEELS. FIGS. 4200-05.

L

LABEL HOLDER (Postal Car). FIGS. 3069, 3083, 3086-88. Made both single and double. Sometimes combined with a drawer pull.

LACE (English). See, BROAD LACE. PASTING LACE. SEAMING LACE.

LADDER. 59, FIGS. 159-69. Bars of wood or iron attached to the side or end of a box car so as to form steps by which persons may climb to and from the top of the car.

The individual bars, whether of wood or iron, and whether round or square, are termed ladder rounds. They are sometimes made with LADDER SIDE RAILS, which see. The handles alongside of the ladder are termed grab irons, or hand holds, or sometimes corner handles; that placed on the roof near the ladder, the roof grab iron or ladder hand rail. See, PROTECTION OF TRAINMEN.

LADDER HANDLE. 60, FIGS, 159-69. A ROOF GRAB IRON or HAND HOLD, which see.

LADDER ROD. An iron ladder round.

LADDER ROUND. 59, FIGS. 159-69, etc.; FIGS. 559-60, etc. See, LADDER. The lower round of the ladder, by recommendation of the Master Car Builders' Association, should be a bent ladder round, as a safeguard against the slipping of the foot in swinging around the corner of a car.

LADDER SIDE RAILS. The wooden vertical side pieces to which wooden or iron ladder rounds are attached. This form of constructing the ladder is more common than ladder rounds directly secured to the end of the car.

LA FLARE SPRING INSULATION. FIGS. 1067-69. A system of insulation for refrigerator car doors, in which the openings are securely sealed against the outside air by strips pressed against the door by springs set in the posts.

LAG SCREW (English, Coach Screw). An iron bolt with a square or hexagonal head, and with a wood screw thread cut on it, intended to screw into wood. Lag screws are round under the head, so that they can be turned after they enter the wood.

LAMBREQUIN. FIG. 3723. A cloth or drapery fastened over the upper part of a window. It covers the rod and rings or roller of the window curtains. The lambrequin has been replaced by VALANCES, which see.

LAMINATED BUFFING SPRING (English). A half elliptic spring. See, PLATE BUFFING AND DRAFT SPRING.

LAMP. FIGS. 2568-2748. "A vessel for the combustion of fluid inflammable bodies for the purpose of producing light."—Webster. The chief forms of lamps now used are for burning gas and mineral oil or petroleum, though candle lamps are used in cases of emergency, as also oil lamps for lard oil, for panel lights, lanterns, etc. Car lamps are distinguished as side lamps and center lamps, the latter now usually consisting of two or more distinct lamps, forming a chandelier. In England roof lamps, inserted from the roof of the car, are exclusively used. Lamps are also distinguished as adjustable globe, loose globe and plastered or fixed globe, the latter being a form in which the lamp is removed from below and the globe cannot be taken off. Many modern lamps are constructed upon the TORNADO or HURRICANE principle, which see, to avoid the effects of draft. Postal car lamps or chandeliers are a special class, in which every means possible is used to obtain a powerful light. See also, ACME LAMP. ALCOVE LAMP. GAS LAMPS. SIGNAL LAMP. TAIL LAMP, etc.

LAMP ALCOVE. A metal casing or lining for a recess in the side of a car to contain an ALCOVE LAMP, which see.

LAMP ARMS. 4, FIGS. 2694-2710. Rods by which a lamp is attached to the ceiling of a car. Some lamp arms have bracket angles to support the shade, and are then called bracket arms.

LAMP BOTTOM. 20, FIGS. 2694-2710. The lower portion of a lamp which is removable. Contains the wick, burner and oil. See, CANDLE BOTTOM.

LAMP BRACKET. See, SIDE LAMP BRACKET.

LAMP BURNER. FIGS. 2319-25; 8, FIGS. 2694-2710. That portion of a lamp by which the opening on the top of the reservoir is closed, which holds the wick, and by which the latter is adjusted. The ACME and DUAL BURNERS, which see, are favorites for car service where a brilliant light is wanted, but many forms are used. The name burner is also applied to the tips of a gas light in the Pintsch gas system. See, FIGS. 2519-25.

LAMP BURNER (English). The wick holder in the ROOF LAMP, which see.

LAMP CANOPY. FIGS. 2663-73. A large and elaborate SMOKE BELL, which see.

LAMP CASE (Street Cars). 1. A box over the end windows in which a lamp is placed. It has a glazed door on the inside and usually colored glass on the outside as a signal to designate the line to which the car belongs. It is fastened by a lamp case hook and eye.

2. (English.) A cylindrical sheet of iron for the protection of the ROOF LAMP, which see.

LAMP CASE BASE OR PACKING (English). A wooden packing piece secured to the roof boards and presenting a level face for the lamp case. See also, ROOF LAMP.

LAMP CASE CHIMNEY (Street Cars). A metal pipe through which the smoke and gases escape from a lamp case, very similar to a LAMP JACK, which see.

LAMP CASE DOOR (Street Cars). See, LAMP CASE.

LAMP CASE DOOR HOLDER. A kind of hook attached to the roof.

LAMP CASE EYE. See, LAMP CASE.

LAMP CASE HOOK. See, LAMP CASE.

LAMP CHIMNEY. A glass tube which incloses the flame of a lamp, conducts away the smoke and gases and produces the necessary draft.

FIGS. 2678-86 give what are known as the standard types. For the names of which see engravings.

LAMP CHIMNEY BRACKET. 12, FIGS. 2694-2710. A projecting metal arm attached to the side of a car and carrying a chimney holder, by which a lamp chimney is held in place.

LAMP CHIMNEY HOLDER. 11, FIGS. 2694-2710. See above.

LAMP CHIMNEY REFLECTOR. 15, FIGS. 2694-2710. Usually it

has a hole in the center in which the chimney is inserted.

LAMP COVER, OR LAMP PROTECTOR (English). American equivalent, lamp jack. A sheet iron cover hinged to the lamp case and secured by a spring catch to protect the lamp from rain, while it allows the smoke to escape. See also, ROOF LAMP.

LAMP COVER SPRING CATCH (English). See above.

LAMP FOUNT. The receptacle for the oil burned in a lamp. Also called lamp reservoir.

LAMP GLASS (English). In a carriage, a hemispherical glass globe of unusual thickness, which surrounds the burner of a ROOF LAMP, which see.

LAMP GLOBE. FIGS. 2548-67; 28, FIGS. 2694-2710, etc. A glass or porcelain case or vessel inclosing or surrounding the flame of a lamp or candle, and intended to protect the latter from wind. Lamp globes are approximately globular in form, in distinction from a lamp shade, which flares at the bottom, but are often made of different shapes, as round, pear shaped, egg shaped, melon shaped, double cone shaped, etc.

LAMP GLOBE CHIMNEY. 3, FIGS. 2694-2710. A metal tube attached to the top of a lamp globe for conducting away the smoke. A shade cup is an equivalent device for a lamp shade.

LAMP HOLDER. See, SIDE LAMP HOLDER.

LAMP HOOP. A ring with an interior screw thread for attaching to cheap oil lamps to receive the burner.

LAMP IRON (English). American equivalent, tail light holder, or signal light holder. See, END LAMP IRON and SIDE LAMP IRON.

LAMP JACK. A cap or covering over a lamp vent on the outside of a car to exclude rain and prevent downward currents of air. Also see, LAMP CASE CHIMNEY.

LAMP KEY (Pintsch Gas). FIG. 2513. A substitute for the ordinary cock of gas fixtures, used to prevent unauthorized tampering with the burners.

LAMP PLUG (English). A cylindrical piece of wood secured to the lamp case by a chain, and used to block up the lamp aperture in the roof when the lamp is not in its place. See, ROOF LAMP.

LAMP PLUG STAND (English). A cast iron stand on which the lamp plug rests when the ROOF LAMP, which see, is in use. Its object is to prevent the lamp plug bumping on the roof of the carriage when the train is moving.

LAMP REFLECTOR. 14, FIGS. 2694-2710. See also, ALCOVE LAMP REFLECTOR.

LAMP RESERVOIR. 6, FIGS. 2694-2710. The portion of a lamp which holds the oil. Also called lamp fount.

LAMP RING. 5, FIGS. 2694-2710. A metal ring at the base of a lamp, to which the lamp bottom or reservoir and lamp globe are attached. In center lamps the ring is supported by the lamp arms.

LAMP SCREW. A more elaborate LAMP HOOP, which see, with a flange.

LAMP SHADE. 2, FIGS. 2694-2710. A conical shaped reflector placed over a lamp to reflect the light downward.

FIGS. 2674-77 and 2687-89 give what are known as standard forms, the dimensions of which, in inches, are as shown in the figures.

LAMP SOCKET. FIGS. 2711-25. A socket or dove tail joint to which a lamp or flag is attached at the corner of a car. They are flat, inclined, angular or projecting, as may be desired.

LAMP STAY. 1, FIGS. 2694-2710. A horizontal bar, usually reaching from side to side of the clear story, by which a car lamp is steadied, and also made more ornamental.

LAMP VENT. An opening in the roof, through which the gases from a lamp escape.

LANTERN. FIGS. 2730-37. A portable lamp, the flame in which is protected from wind and rain by glass, usually in the form of a globe surrounded by wires, called guards. According to the number of these wires the lantern is called single, double or triple guard. The conductor's lantern is one with a large bail, so as to be carried on the arm, leaving both hands free. It is usually provided with a reflector above. Inspector's lanterns are generally arranged to give blue light. See, LENS. SIGNAL LIGHT.

LANTERN AND FLAG HOLDER. A device for displaying signals on rear of trains. See, FLAG HOLDER. The novelty is the convenience of attachment for either a lamp or flag.

LARRY. See, LORRY.

LAPPIN BRAKE SHOES. FIG. 1011. A brake shoe cast from a mixture of metals, which is a solid casting with alternate sections of hard chilled and soft parts. The chilling of the harder sections is done in the usual manner by chilling blocks brought into contact with the molten metal. The process gives no sharply defined line between the hard and soft sections, to make a cutting edge, as the chilled parts radiate into and mingle with the soft metal, and thus disappear. The number and area of the soft sections can be increased or diminished by changing the number and size of the chilling blocks in the mold, and the holding power of the shoe thus varied to suit the conditions of service.

LATCH. FIGS. 1902-34, etc. The primary sense of this word is—to catch, to close, stop, or make fast; hence, an attachment to a door, window, etc., to hold it open or shut, is called a latch. The ordinary distinction between a latch and a lock is that a lock is closed and opened with a separate key, and usually has a square bolt; whereas, a latch has no separate key, and usually has a beveled bolt which snaps shut automatically by contact with the keeper or strike plate. The most exact distinction between a latch and lock seems to be the form of the bolt, and not the use or disuse of a key. See, SASH LOCK. Latches named from the use which they subserve are the following, which see:

BERTH LATCH.	SALOON LATCH.
DECK SASH LATCH.	SLIDING DOOR LATCH,
SAFETY BERTH LATCH.	OR LIFT LATCH.
SAFETY STRAP LATCH.	SPRING DOOR LATCH.

A sliding door latch, or lift latch, FIGS. 1914-34, has a beveled hook instead of a beveled bolt, but operates upon substantially the same principle. Nearly all forms of latches are spring latches. A night latch is a large and carefully made form of an ordinary latch, which can be opened from the outside by a key. A cupboard latch is any form of small latch. A rim latch, like a rim lock, is one attached simply to the outside of the door, in distinction from a mortise or rabbeted latch (both rarely used), which is boxed into the door.

LATERAL MOTION. A movement sidewise, more particularly meaning, as generally used, a side or swing motion of the bolster of a swing motion truck, in distinction from the end play of an axle under the journal. A lateral motion spring, which is slipped over a lateral motion spring pin, is sometimes used to check the lateral movement of such spring bolsters, but this end is more commonly accomplished by splaying the swing hangers outward.

LATERAL MOTION SPRING. 40, FIGS. 3735-3951. See above.

LATERAL MOTION SPRING PIN. 41, FIGS. 3735-3951. See above.

LATERAL PLAY. Side motion of any part of a car or machinery; the space left to permit of such side motion. See, LATERAL MOTION (of a Truck Bolster). END PLAY (of an Axle).

LAVATORY. A room provided with washbowl, towels, combs, brushes, etc., in which passengers may make their toilet. Parlor and sleeping cars are provided with separate lavatories for men and women, which are separated from the saloons. The best and most modern coaches have a lavatory. See, WASH ROOM. A saloon is sometimes termed a lavatory.

LAVATORY CARRIAGE (English). A passenger vehicle in

which two or more compartments have access to a small lavatory, urinal, etc. See also, CARRIAGE.

LEAD CAR SEAL. FIGS. 3122-25, etc. Lead seals are either in the form of rivets or buttons. Both are in common use. See, CAR SEAL.

LEAD LINED JOURNAL BEARING. A journal bearing which has its inner surface covered with a thin layer of lead, so that it may fit itself to the journal as soon as subjected to wear. Such bearings are often called Hopkins journal bearings. A variety of other bearings are more or less similar, but a greater quantity of lead or babbitt metal is frequently used.

LEAD RIVET CAR SEAL. FIGS. 3122-25, etc. See, CAR SEAL.

LEAD SEAL. FIGS. 3122-25, etc. See, CAR SEAL. LEAD CAR SEAL.

LEADERS (of Pile Driver Car). The long vertical timbers serving to guide the HAMMER (which see) in its fall. The leaders swing upon leader trunnions, carried on the leader trunnion pedestal. They are stiffened at some point midway of their length by top stringers, leader braces, and commonly by pilasters at the outside, which latter serve to support the top stringers. They are connected at the top by a leader cap and at the bottom by a leader cross piece, the latter attached at the side in such a manner as not to interfere with the fall of the hammer.

LEADER BRACE (Pile Driver Car). See above.

LEADER BRACE POCKET (Pile Driver Car). See above.

LEADER CAP (Pile Driver Car). A cross piece connecting the two leaders at the top and carrying the main sheave and pile hoisting sheave of the hoisting gear.

LEADER CROSS PIECE. See, LEADER.

LEADER STAY. An oblique diagonal brace, attached at the upper end to the top stringers, serving to stiffen the leaders.

LEADER TRUNNION. See, LEADER and TRUNNION.

LEAKAGE GROOVE (of Westinghouse Brake Cylinder). A small passage past the brake piston to prevent application of the brakes by trifling leakages of air.

LEATHER. See, PISTON PACKING LEATHER. PACKING LEATHER. WINDOW SHADE LEATHER. SOLID LEATHER NAILS.

LEATHER BELL CORD. See, BELL CORD.

LEATHEROID. A substance somewhat resembling leather, and somewhat similar to VULCANIZED FIBER, which see, in its general character and appearance. It is made by treating paper with sulphate of zinc.

LEATHER SEAT. A DUST GUARD BEARING, which see.

LEFT MAIN VALVE CYLINDER HEAD (Air Pump). 85, FIGS. 893-94.

LEFT MAIN VALVE HEAD GASKET (Air Pump). 108, FIGS. 893-94.

LEG. See, SEAT LEG.

LEG IRON (English). See, STEP IRON.

LEG REST (Reclining Seats). 30, FIGS. 3151-52. A bracketed and adjustable shelf, which may be used on a chair seat to support the limbs when the seat or chair is in a reclining position. It is adjusted by a leg rest ratchet and leg rest pivot casting, as in FIG. 3172, or by a leg rest slide fitting in a leg rest socket casting, as in FIGS. 3190-91.

LENGTH (of Elliptic Springs). The distance from center to center of scrolls when the spring is unloaded.

LENS. An optical instrument for conveying rays of light upon a fixed path or fixed point. Lenses for lanterns consist of three types—bull's eye, a double convex or plano convex lens; semaphore (a mere modification of the Fresnel), and the Fresnel proper, the latter rarely used.

LEONARD HYDROSTATIC BUFFER. See, HYDROSTATIC BUFFER.

LETTER BOARD (Passenger Car Exteriors). 91, FIGS. 360-72, 388-91. A horizontal board under the cornice, extending the whole length, on which the name of the company to which the car belongs is usually painted. The letter board occupies the frieze of the car, and is often so called.

LETTER BOX PLATE. See below.

LETTER CASE LABEL HOLDERS. FIGS. 3068, 3077.

LETTER DROP (Postal Cars). FIGS. 3065-66. A plate with a spring flap for receiving letters for the post. A letter box lid.

LETTERING (of Freight Cars). FIGS. 4551-53. In 1893 the M. C. B. Association adopted a Recommended Practice for Marking Fast Freight Line Cars, as shown in FIGS. 4551-53. It was resolved:

1st. The half of side of car on which the doors do not slide to show the name of the 'Fast Freight Line,' spelled out in full, and the car number in the Fast Freight Line series immediately below it. In the same panel and within 2 ft. of the sill shall appear, in letters not over 4 in. high, the name of the railroad company owning or contributing the car, and between the same and the sill shall appear the light weight of the car, with such other information as it is found advisable to give in connection with same.

"2d. Side doors to bear the initials of the road to which the car belongs, or the name of the line on which the car is used, together with the number of the car.

"3d. The ends to show the initials of the 'Fast Freight Line,' with the car number in the Fast Freight Line series, and the light weight just below them; no other marks will appear on ends of car.

"4th. The half of sides of cars on which the doors do slide to be reserved for advertising symbols or trade marks, where used. The use of profuse lettering in this panel is to be discouraged, however, and it is recommended that only the simplest trade marks or advertising signs should be used; the capacity of the car to appear near the sill in this same panel."

LEVER. "In mechanics, a bar of metal, wood or other substance, turning on a support called a fulcrum."—Webster. See,

BRAKE LEVER.
BRAKE EQUALIZING LEVER.
CENTER BRAKE LEVER.
COMPRESSION LEVER.
CYLINDER LEVER.
DEAD LEVER.
DOOR SHAFT LEVER.
ECCENTRIC LEVER.
FLOATING LEVER.
HAND CAR LEVER, OR PROPELLING LEVER.
LIVE LEVER.
PLATFORM LEVER.
RELEASE LEVER.
ROOF LEVER.
THUMB LEVER.
TRIPPING LEVER.
UNCOUPLING LEVER.

LEVER AND RACK JACK. FIGS. 2983-4. See, BARRETT'S JACK.

LEVER FAUCET. FIGS. 2763-64. A self closing faucet, shut by a spring and opened by the movement of a handle or lever. Also called telegraph faucet. They are called vertical or horizontal according to the direction of the pipe or opening into which they are fastened.

LEVER FRAME (Hand Car). 17, 18, FIGS. 4722-27. A wooden frame shaped somewhat like a letter A, on top of a hand car, which supports the lever shaft and lever.

LEVER FRAME CAP (Hand Car). 18, FIGS. 4722-27. A short horizontal piece of timber, to which the lever journal bearings are fastened.

LEVER FRAME POST (Hand Car). 17, FIGS. 4722-27.

LEVER FRAME TIE ROD (Hand Car). 25, FIGS. 4722-27. A vertical rod by which the lever frame cap is bolted to the floor frame.

LEVER GUARD. A guide on the platform rail for the platform upcoupling lever.

LEVER GUIDE. See above and BRAKE LEVER GUIDE.

LEVER HAND CAR. FIGS. 4722-27. The common style of HAND CAR, which see, worked by levers connected to cranks. These levers are usually placed horizontally, but sometimes they are vertical. Double lever hand cars, to avoid danger of trouble with the dead center, have been in use. See, HAND CARS.

LEVER HANDLE (Janney-Buhoup Platform). 152, FIGS. 1526-1613.

LEVER HINGE BRACKET (Janney-Buhoup Platform). 148, FIGS. 1526-1613.

LEVER SHAFT. 1. (Hand Car.) 21, FIGS. 4722-27. A short iron shaft to which the propelling levers are attached.

2. (Engineer's Valve.) 120, FIGS. 968-71.

LEVER SHAFT BEARINGS (Hand Car). 22, FIGS. 4722-27.

LID. See, JOURNAL BOX COVER. JOURNAL BOX LID. SALOON SEAT LID.

LIFT. A finger hold attached to windows and window blinds to take hold of in raising or lowering them. See, SASH LIFT. WINDOW BLIND LIFT.

LIFT LATCH, OR SLIDING DOOR LATCH. FIGS. 1914-25, etc. A lock, the latch of which is lifted by turning the knob instead of drawing it backward.

LIFT LATCH LOCK. "A lock in which the latch is pivoted and lifted free of the keeper, passing through a notch in the box instead of being simply retracted."—Knight.

LIGHTNING ARRESTER. FIGS. 4826, 4828-9. A device for protecting electrical apparatus from damage by lightning. It usually consists of an air gap in series with a non-inductive resistance connected between power circuit and ground. The gap serves as an easier path to ground for high voltage discharge than through the electrical apparatus. The gap is provided with a magnetic blowout that extinguishes the arc after discharge.

LIGNOMUR. A decorative head lining made from strawboard or paper, with figures stamped or embossed upon it. The figures are usually light colored, while the background is darker. It is glued to a thin narrow matched ceiling or may be applied directly to an old veneered ceiling.

LIMIT GAGE. A term applied to many forms of gages which are used for determining whether pieces do not exceed or fall below a certain specified range of dimension. In 1893 limit gage and diameters for round iron were adopted as a Recommended Practice; these had formerly been standard of the Association. Limit gages, such as shown herewith for 1¼ inch iron, are recommended for use in procuring round iron to take the Seller's standard screw threads; round iron used to be of such size as will enter the large or + end of the gage intended for that size, in any way, and also of such size as will not enter the small or — end in any way.

FIG. 17.

FIG. 18.

The limiting diameters for certain nominal sizes of iron, together with the maximum variation allowable by such use of these gages, are given in the following table:

SIZES OF LIMIT GAGES FOR ROUND IRON.

Nominal diameter of iron. Inches.	Large size. + end. Inches.	Small size. — end. Inches.	Total variation. Inches.
¼	.2550	.2450	.010
5-16	.3180	.3070	.011
⅜	.3810	.3690	.012
7-16	.4440	.4310	.013
½	.5070	.4930	.014
9-16	.5700	.5550	.015
⅝	.6330	.6170	.016
¾	.7585	.7415	.017
⅞	.8840	.8660	.018
1	1.0095	.9905	.019
1⅛	1.1350	1.1150	.020
1¼	1.2605	1.2395	.021

LINCRUSTA WALTON. A decorative material for walls and ceilings, having something of the appearance and toughness of leather. It is made from the residuum of boiled linseed oil mixed with sawdust. Designs of any form are pressed upon it and it is furnished in a great variety of colors. It is attached to walls, generally with paste or glue, like wall paper, but is water proof and very flexible.

LINDSTROM RATCHET BRAKE HANDLE. FIGS. 3042-52. A brake handle for wide vestibules intended to work in a small arc of a circle. It is attached to the end panel of the vestibule and when not in use is pushed against the wall.

LINE CAR. FIGS. 8-13, 28, 39, etc. A short term to designate cars belonging to the various fast freight lines which run over several roads between the leading shipping points east and west. The number of these lines is large, and at the present time they are nearly all owned by associations of the roads themselves and not by private individuals. Their object is to make it possible to issue through bills of lading and to avoid breaking bulk, as well as to obtain greater dispatch.

At the seventeenth M. C. B. Convention, Chicago, 1883, the following resolutions were adopted:

"Whereas, It is a common practice to store line cars on side tracks during summer months or dull times away from home, after they have been in severe service; and,

"Whereas, Many of the cars after being so stored are found to be more or less out of proper condition, so that they need more or less repairs, and when put into service cause much detention to traffic and many transfers;

"Be it resolved, therefore, That it is the sense of this meeting that all line cars owned by foreign companies should be returned to their owners instead of being stored on foreign tracks, and that a competent man should be detailed to inspect the stored cars and to arrange to have the necessary repairs made during the time such cars are out of service."

For standard lettering of line cars, FIGS. 4551-53, see, LETTERING.

LINER BLOCKS (Coupler). Blocks of cast or malleable iron bolted to the top and bottom of the tail end of the coupler or drawbar. They are now usually cast integral with the coupler shank. For different sizes of liner blocks see FIGS. 1316-63.

LINING. See, END LINING. HEAD LINING. INSIDE LINING. FEED DOOR LINING. Inner, outer and intermediate linings of refrigerator cars are those linings or partitions intermediate between the inside lining and the sheathing, which usually consists of ¼ or ⅜ stuff, whose purpose is to make dead air spaces for insulating the contents of the car.

LINING STRIPS. Wooden or metal strips put on the inside of freight or baggage cars to protect the inside of the car from being injured by freight or baggage. Lining strips serve very much the same purpose as inside lining.

LINING STUDS. 54, FIGS. 185-95. Vertical studs placed between the posts and over or under the braces, and to which the lining is nailed.

LINK. 1. "A short connecting piece, of circular or other equivalent shape; as one of the oval rings or divisions of a chain."—Knight.

2. (Coupling Links.) A short bar with an eye at each end for connecting two things together or for supporting one from another. When used alone the term in railroad service always means a COUPLING

LINK, which see. See also, BRAKE BLOCK SUSPENDING LINK. ECCENTRIC LEVER LINK. HANGER LINK.

LINK AND PIN COUPLER. An old type of drawbar by which cars were connected together by a link and a pin. There were a great variety of shapes and devices, but they have now been almost entirely replaced by the M. C. B. automatic coupler.

LINK HANGER. 46, FIGS. 3745-53. A SWING HANGER, which see, in the form of a link.

LINK HANGER EYE BOLT. A bolt passing through the transoms, from which a short swing hanger is suspended.

LINK PIN. A COUPLING PIN, which see.

LINOLEUM. A form of floor covering manufactured from linseed oil, prepared by a special process, mixed with ground cork and backed with canvas. Another floor covering of substantially the same nature as linoleum is known as corticine.

LINTEL. 90 and 99, FIGS. 392-98. The horizontal part of a door or window frame above the sash. See, DECK SASH LINTEL.

LIP. See, RETAINING LIP (Steel Tired Wheels).

LIP LAMP CHIMNEY. One with an indented ring near the bottom, for use with screw lamp burners.

LIVE LEVER. 92, FIGS. 3781-3951. The one of a pair of brake levers to which the brake power is first applied is sometimes given this title, the other lever being termed the dead lever.

LIVE LEVER GUIDE. FIGS. 3869-69a. A guide in which the live lever moves.

LOADING POLES, LOGS AND BARK ON CARS. (M. C. B. Recommended Practice.) FIGS. 4576-4651. In 1893 a Recommended Practice was adopted for loading logs and poles on cars and for racking cars for loading bark, and in 1896 extended rules governing the loading of lumber and timber on open cars were adopted, replacing the former practice, heretofore shown on Sheet B, with the exception of racking cars for loading bark. At the same time rules governing the loading of long structural material, rails, plates, girders, etc., were adopted.

In 1897 some modification of these rules was adopted, with slight changes in the illustrations also. In 1898 still further slight changes were made in the text and in some of the drawings, and a new section was added containing rules for loading large logs, pipe and stone on open cars. In 1900 a further modification was made in both text and illustrations.

For present Recommended Practice see Appendix B, Proceedings 1902.

LOCK. 1. FIGS. 1910-2107. Generically, a fastening of any kind operated by a key. Specifically, one having a dead bolt as distinguished from one having a spring latch bolt, the latter being technically termed a latch. A rim lock is one applied to the exterior or surface of a door. A mortise lock is one designed to be mortised into the edge of a door. A rabbeted lock is one with an offset front to conform in shape to a rabbeted door. A dead lock is one in which a bolt is moved by a key and not a spring. A latch is a lock with a spring bolt. A night latch is a lock with a spring bolt operated from the outside only by a key and from the inside usually by a knob. A padlock is a detached lock provided with a shackle adapted for engagement with a hasp or staple. According to their uses locks are divided into, berth locks, door locks, freight car locks, grain door locks, seat locks, sliding door locks, etc. See also, SASH LOCK. Freight car locks are usually seal locks. See, CAR SEAL. The YALE LOCK, which see, is a special, secure type largely used.

2. (M. C. B. Automatic Coupler.) The catch which drops in front of the knuckle horn and holds it shut, thus locking the couplers together.

LOCK CASE. The outside or covering part of a lock, more especially a padlock.

LOCK CHAIN. A chain by which a padlock is fastened to a car.

LOCK KEEPER. FIGS. 1914-2090. The box on a door jamb into which the bolt of a lock protrudes when shut. See, KEEPER.

LOCK NUT. The outer one of a pair of nuts on one bolt, which, by screwing up separately to a tight bearing, locks the inner one.

LOCK SEAL. A piece of glass, lead or paper, which forms a seal for a lock, so that the latter cannot be opened without its being known. See, CAR SEAL.

LOCKER. A small compartment or closet for storage. A closet is usually the same height as the room and a locker is of less height. Lockers are frequently attached under cars.

LOCOMOTIVE CRANE. A self propelling car, with a steam crane, mounted upon it, which crane has three independent motions, viz.: that of hoisting, slewing or rotating and raising of the boom.

LODGING CAR. A passenger or box car fitted up with sleeping accommodations for men at work on the line of a road. More commonly called boarding car.

LOGGING CARS. FIGS. 54-56. A special variety of light and strong cars used for getting out lumber, running usually on cheap logging railroads.

LONE STAR COUPLER. FIGS. 1401-03.

LONG BRAKE SHAFT. 94, FIGS. 159-69. One which extends up above the top of a car so that brakes can be applied by a person on the roof.

LONG FLAT CAR. A flat car of extra length for long timbers, piling, etc. A barrel car is an example, shown racked in FIG. 14.

LONG SEAT END. A vertical frame of wood or iron which combines a seat end and seat stand together, supports the end of the car seat and also forms the arm or seat end. A short seat end is a seat end proper, which is supported on a separate stand.

LONGITUDINAL RISING TIMBER. See, RISING TIMBER.

LONGITUDINAL SEAT (Street and Suburban Cars). A seat which extends lengthwise of a car.

LONGITUDINAL STEP. 1. A board which extends along the side of an open car, or a car with doors on the side, used as a step in getting on or off the car or for passing from one end of the car to the other.

2. (English.) See, FOOT BOARD.

LONGITUDINAL STEP BRACKET. A bracket to carry a longitudinal step. See above.

LONGITUDINAL TIE ROD (English). Corresponds in part to an American truss rod. A long bolt binding the timbers of the underframe together longitudinally. It is generally horizontal, and if inclined slopes downward to the ends of the vehicle to prevent them sagging or drooping. In English eight wheeled vehicles truss rods are used, but in four wheeled vehicles the ends are more likely to sag than the center.

LOOKOUT (Freight Caboose). 174, FIGS. 343-52. A small cupola or upper deck in the roof to afford opportunity for the display of signal lights and to enable train hands to keep a better lookout on the train.

LOOSE BERTH HINGE. FIGS. 3418-21. A berth hinge, the two parts of which are detachable. It enters into a loose berth hinge bushing or plate. FIG. 3422. See, BERTH HINGE.

LOOSE GLOBE. See, LAMP GLOBE.

LOOSE GLOBE LAMP. A lamp or lantern in which the globe is attached to the frame by springs, screws or catches, so that it can be easily removed.

LOOSE JOINT BUTT HINGE. FIGS. 1947-48. A BUTT HINGE, which see, permitting the door to be lifted off its hinges when desired.

LOOSE PIN BUTT HINGE. FIG. 1953-55. A BUTT HINGE, which see, having a removable hinge pin.

LORRY, OR LARRY. FIGS. 4717, 4729-3. Push cars used in construction for moving rails, ties, etc. Often made

with only a half bearing for the journals so that the frame can be removed from the wheels at any time.

LOW SIDED WAGON (English). A freight car with sides and ends about 9 in. high. It has generally no doors, and is used chiefly for conveying pig iron and similar loads.

LOW TRUCK. Trucks constructed so as to bring the floor nearer to the rails; mainly used in construction service. They are commonly constructed so as to bring the floor about 3 ft. 2 to 6 in. from the rail, instead of about 4 ft.

LOWER ARCH BAR. The INVERTED ARCH BAR, which see. See, ARCH BAR.

LOWER BERTH (Sleeping Cars). 1, FIGS. 1778-80-83. The bed nearest the floor made up by pulling out the seats and dropping down the seat backs. The mattress for it is carried by day in the pocket formed by the upper berth. See, BERTH.

LOWER BERTH STOP BAR. 49, FIG. 1778-83. See, STOP BAR.

LOWER BRAKE ROD. 97, FIGS. 3781-3951. A rod which connects the two brake beams or levers of outer hung brakes. When two levers are used the rod is attached to each lever. It is sometimes supported in case of accident by a lower brake rod carrier. With inner hung brakes the substitute for the lower brake rod becomes a part in compression and is called the brake lever coupling bar.

LOWER BRAKE SHAFT BEARING. 97, FIGS. 159-69 and FIGS. 516-17. An eye or support for a vertical brake shaft, near the lower end. The support at the lower end is called the brake shaft step. The lower bearing is above the step.

LOWER CHORD (of a Truss). The lower outside member. In the side trussing of a freight or passenger car the side sill is the lower chord.

(The distinction between a lower chord and a truss rod is not very clear. A chord is usually so called only in a truss having both vertical and inclined members. A mere trussed beam is not a truss in modern technical usage.)

LOWER CORNER PLATE. 57, FIGS. 159-69. See, CORNER PLATE. A push block, or push pole corner iron, is usually the lower corner plate. 191, FIGS. 159-69.

LOWER DECK. 102, FIGS. 388-91. The main roof of a passenger car on each side of the clear story or upper deck.

LOWER DECK CEILING (Sleeping Cars). 22, FIGS. 1778-83. The inside finish of the lower deck which forms the top finish for the upper berth.

LOWER DIAPHRAGM (Pintsch Lamp). 286, FIGS. 2605-21.

LOWER DISCHARGE VALVE (Air Pump). 46, FIG. 965. A PUPPET VALVE, which see, at the bottom of the air pump through which the air below the piston escapes.

LOWER DOOR HINGE (English). See, DOOR HINGE. This hinge is made with a longer butt than the others, to allow for the curvature or fall under of the door.

LOWER DOOR PANEL. 10, FIGS. 1029-37.

LOWER DOOR SASH. 13, FIGS. 1029-31. The lower section of a door sash, which is made in two parts. This is commonly movable, the other fixed.

LOWER FOOT BOARD (English). American equivalent, platform step. A board running nearly the whole length of the carriage, and situated about 20 in. from the ground.

LOWER HEAD (Air Pump). 64, FIGS. 893-94. The AIR CYLINDER HEAD, which see.

LOWER INTERMEDIATE VALVE SEAT. 40, FIG. 965.

LOWER RECEIVING VALVE CHAMBER (Air Pump). 39, FIG. 965.

LOWER SEAT BACK RAIL (Street Cars). Also called a seat back bottom rail. See, UPPER SEAT BACK RAIL.

LOWER SWING HANGER PIVOT. 48, FIGS. 3781-3951. A bar by which a spring plank is attached to the lower end of a SWING HANGER, which see.

LOWER THIMBLE (Pintsch Lamp). 290, 290a, FIGS. 2605-21.

LOWER WAINSCOT RAIL (Passenger Car Interiors). 74, FIGS. 388-91; D, FIG. 1781. A longitudinal rail immediately above the truss plank. The upper wainscot rail comes directly below the window.

LOWER WINDOW BLIND. 140, FIGS. 388-91. The lower section of a window blind which is made in two parts, as is usually the case.

LOWER WINDOW BLIND LIFT. FIGS. 3593-3620. The lifts for lower blinds differ from those for a single blind in having a lug which engages with the upper blind when the lower one is raised up half way, and thus the upper one is raised with the lower one. See, WINDOW BLIND LIFT.

LUBRICATOR. FIGS. 920, 979. An instrument used for applying a lubricant. Also called oiler. See, AUTOMATIC LUBRICATOR.

LUG. A projecting stud or ear to afford a bearing or point of attachment. See, FOLLOWER PLATE LUG.

LUG BOLT. A STRAP BOLT, which see, with a lug turned up at one end to enter a mortise in the timber and in part relieve the attaching bolts from strain.

LUMBER. Timber of all kinds sawed into merchantable form, but more particularly such as is not sawed into boards. The term, however, is often used in the broad sense.

LUMBER CAR. A car of extra length, sometimes 40 ft. long, more particularly intended for carrying long timbers. Box and stock cars frequently have end doors to facilitate the loading of lumber. Gondola cars, with flat bottoms and drop doors, are largely used for lumber.

LUMBER LORRY. See, LORRY CAR.

M

McCORD JOURNAL BOX. FIGS. 4107-10.

McCORD SPRING DAMPENER. FIG. 4150.

McELROY COMMINGLER SYSTEM (Consolidated Car Heating Co.). FIGS. 2319-23. This system depends upon the direct action of the steam upon the water of circulation, caused by the steam discharging within the body of the water itself. The contact of the steam and water takes place within the pear shaped body of the commingler, a sectional view of which is shown in FIG. 2320. The flow of steam is broken into small jets within a body of quartz pebbles, to destroy the noise and to silently force the water through the commingler. The steam jets give a forced as well as a gravity circulation, which feature of forced circulation enables the commingler to move the water through large circuits. The heating system is kept constantly filled from the condensation which takes place within the commingler, and the water in the expansion drum kept level with the top of the overflow pipe. It is claimed that 5 lbs. steam pressure in the train pipe at the car is sufficient to heat a car in the coldest weather.

McELROY COMMINGLER STORAGE SYSTEM (Consolidated Car Heating). FIG. 2324. A system of heating in which a small commingler is placed under the center of the car and so arranged that when the car is not in use there is no water in the system. In heating up a car the heating is accomplished by forcing live steam into the pipes, and the water of condensation that collects is circulated by the commingler through the pipes, thus automatically operating as a hot water circulating system, whose temperature may be run high or low, depending upon the amount of inflowing steam. On laying off a car a valve is turned and the water of circulation allowed to drain to the ground.

McGUIRE GRAIN DOOR. FIGS. 1087-1106. A grain door fastened to a grain door rod by a U-strap or arm and hung to the carlines, when not in use by an overhead door catch. The door post is protected by a door post angle iron. The door is held in place by a door keeper, G, and a button head, L, and the corners are shod with a shoe, N.

McKAY'S CURTAIN BRACKETS. FIGS. 3725-28. A form of bracket for holding the various forms of spring roller curtains, one bracket having a rectangular hole and the other a circular. A variety of patterns are made besides those shown. The McKay and Hartshorn shade roller accomplish the same end in much the same way, but the McKay works with a cam, while the Hartshorn works with a pawl. See, SHADE ROLLER.

McKEE-FULLER STEEL TIRED CAR WHEELS. FIGS. 4173-76.

MACHINE BOLT. A bolt with a metal thread cut on it, and with a square or hexagonal head, especially if turned or finished. The word bolt, unqualified, usually means a machine bolt.

MAGAZINE (Base Burning Stoves). A general term for a receptacle for coal before it reaches the fire pot proper, usually situated directly above the latter.

MAGNETIC CURTAIN HOLDER. A device for holding a window shade fixed in any position, while still leaving it easily movable. It consists simply of a bar magnet running across the lower edge of the shade, bearing against two fixed bars of soft iron, one on each side of the window, to which the magnets attach themselves.

MAGNETIC TRACK SHOE BRAKE. FIG. 998. A brake for electric cars which has, besides the usual brake shoes on the wheels, a sliding shoe, which fits the rail and which, when the current is applied, is drawn down to the rail by magnets energized from the current set up in the armature of the motor acting as a generator. By a suitable system of links the shoes on the wheels are applied at the same time by the movement of the track shoe.

MAIL CAR. A car for carrying mails. More properly a postal car. FIGS. 112, 378-79. Mail cars are sometimes defined as those used only for carrying mail bags and not for distributing mail matter, but the distinction is not always observed. Distributing mail cars are, however, always called POSTAL CARS, which see. See also, COMBINATION BAGGAGE CAR.

MAIL CAR LAMP. FIG. 2584. See, POSTAL CAR LAMP.

MAIL CATCHER OR COLLECTOR. FIG. 3079. A contrivance consisting of a bent iron bar attached to the door of a postal car for taking up or "catching" mail bags while the train is in motion. The English system of collecting mail bags is different from the American, and relies upon the use of nets. The leather bag is fastened by a spring to an iron bar in the car, and when the exchanging station is near the bar is turned out, the bag hanging suspended. At the same time the catching apparatus, consisting of a net attached to a bar, is put out. The bag from the car is caught in a net attached to a stationary post and the bag for the car caught in the car net in a similar manner. The American plan has been copied in Australia and India.

MAIL CATCHER SOCKET, OR MAIL COLLECTOR SOCKET. The brackets or sockets on either side of the postal door which hold the collector.

MAIL VAN (English). A vehicle adapted to run on passenger trains and fitted with apparatus for sorting and conveying letters, and generally with apparatus for taking up and dropping mail bags while the train is at full speed. A mail van in which letters can be posted and letters are postmarked is termed a traveling postoffice. When fitted only for conveying mail bags and not for sorting it is termed mail van tender. Every projecting piece of either wood or metal is carefully padded to prevent injury to the postoffice officials in collisions, etc.

MAIN CARLINE (Freight Cars). A carline stronger than the ordinary carlines, so as to support the roof and tie the two plates together.

MAIN COCK (Pintsch Gas Lighting). FIG. 2475. A cock usually placed in the saloon for the control of the low pressure supply. It regulates all the burners at once, in addition to which there are separate cocks to each. 25, 25b, 25c, FIG. 2475, are respectively for ¼ in., ⅜ in. and ½ in. pipe, and are used in all classes of cars, according to size of main low pressure pipe required. 25c (½ in.) is in most general use. This cock is handled with key, FIG. 2513.

MAIN COCK (Pintsch System). FIG. 2530. No. 22. A ¼ in. tee handle cock for postal or express cars.

MAIN COCK COVERS (Pintsch System). No. 135, 135C, FIG. 2476. For main cocks, No. 25, 25B, 25C, FIG. 2475. They are of cast iron, with hinged lid to fit over key shaft of cock. Are to be screwed to side of car or to bulkhead.

MAIN FLOOR (Refrigerator Car). G, FIGS. 185-95. The top layer of boards in the floor of the car. See, FLOOR.

MAIN PIPE (Air Brake). The brake pipe.

MAIN PISTON RING (Triple Valve). 3, FIGS. 959-62.

MAIN RAFTER. A MAIN CARLINE, which see.

MAIN RESERVOIR (Air Brake). FIG. 931. A cylindrical boiler plate tank, carried on the locomotive, under the foot board, to hold a supply of compressed air. So called in distinction from the auxiliary reservoirs under each car.

MAIN SLIDE VALVE (Air Pump). 83, FIGS. 893-94.

MAIN SLIDE VALVE (Engineer's Valve). 114A, FIGS. 968-71.

MAIN STEAM CASTING (Consolidated Car Heating). FIG. 2319. A casting connected into the train pipe and provided with side ports, not connected to the train pipe ports, but connected to a drip port through which water drops to the ground. The return pipe from the heating apparatus is connected into these side ports from one or from both sides of the car. The pipe leading to the casting is heated by the train pipe and the casting prevents the drip from freezing.

MAIN STEAM VALVE (Air Pump). 76, FIGS. 893-94. A valve admitting and exhausting steam above and below the main piston. At the end of the stroke they are reversed by steam being admitted above the reversing piston by the reversing valve, 72. They are usually called simply main valves.

MAIN VALVE BUSH (Air Pump). FIG. 892, and 75, FIGS. 893-94.

MAIN VALVE CYLINDER HEAD (Air Pump). 84, 85, FIGS. 893-94.

MAIN VALVE PACKING RINGS (Air Pump). 78, 80, FIGS. 893-94.

MAIN VALVE PISTON (Air Pump). 76, FIGS. 893-94.

MAIN VALVE PISTON PACKING RING (Air Pump). 78, 80, FIGS. 893-94.

MAIN VALVE STEM (Air Pump). 81, FIGS. 893-94.

MAIN VALVE STEM NUT (Air Pump). 82, FIGS. 893-94.

MAJOR COUPLER. FIGS. 1421-33.

MALE CENTER PLATE. The body and truck center plates are sometimes called male and female. See, CENTER PLATE.

MALLEABLE IRON. Castings whose brittleness has been removed by packing them in powdered hematite (peroxide of iron) in tight fire brick cases and subjecting them to a continued red heat for about a week. They are then allowed to cool slowly. The oxygen of the hematite combines with and removes a part of the carbon of the iron, making the castings almost as tough as wrought iron, but they are ordinarily not truly malleable, or capable of being rolled or forged. Malleable iron is much used for pipe fittings and similar small castings, and even for brake shoes.

MANDREL. 1. (For Lathes.) A shaft serving as a temporary axis for objects to be turned.

2. (Foundry.) A plug around which a body of metal is cast.

MANDREL PIN, OR CROSS BAR (Swing Link Hanger). 44, FIGS. 3781-3951. The bar which supports the spring plank. See, SWING HANGER.

MANHOLE. 110, FIGS. 325-37. An opening in a boiler or tank through which a man can creep to the inside. The tanks for tank cars always have manholes on top.

MANHOLE COVER. 111, FIGS. 325-37. A plate or lid to close a manhole.

MANHOLE COVER CHAIN. A chain with which a manhole cover is fastened to a tank to prevent it from falling off the tank when the manhole is opened.

MANHOLE HINGE. 113, FIGS. 325-37. A hinge by which a manhole cover is attached to manhole ring.

MANHOLE RING. A metal ring riveted around a manhole, and which forms a seat for the cover.

MANSELL RETAINING RING. FIGS. 4227-8, 4237. A mode of connecting steel tires to the wheel centers by a ring of an approximate L or U cross section, which secures the tire to the wheel, so that every part of the tire is securely held, into however many pieces it may be ruptured. This ring is almost universally used in English passenger service. Various applications of the ring are shown in the figures.

MANSFIELD DECK SASH OPENER. FIGS. 3504-06. One of the numerous styles of deck sash openers, the peculiarity in which consists in the manner of connecting each end of each deck sash to an opener in such manner that either the front end or the back end of the window may be thrown open, producing draft either into or out of the car, at discretion.

MARKING CARS. In 1893 a Recommended Practice was adopted as follows: That all railroad companies having the same initials as other railroad companies should stencil the name of the road in full on some part of the car where it may be readily seen. See, LETTERING.

MARSHALING (English). American equivalent, switching, or drilling. Arranging the cars of a freight train in proper station order.

MAST. 1. (Of a Derrick or Crane.) The main upright member against which the boom abuts.

2. (Of Brake Gear.) A BRAKE SHAFT, which see.

MAST POCKET (Wrecking Car). A heavy casting under the car supported by a derrick truss rod serving as a socket for supporting the mast of a derrick to hold it upright. Another method of supporting the mast is by a large base plate, bolted to the floor of the car.

MAST SHEAVE OR PULLEY (of a Derrick or Crane). A sheave or pulley wheel placed at the top of the mast.

M. C. B. REPORTS. In 1893 a standard size of 6 inches by 9 inches was adopted for M. C. B. reports.

In 1894 a standard size for Pamphlets, Catalogues, Specifications and publications of that nature was adopted, as follows:

For postal card circulars, 3¾ inches by 6⅛ inches.

For pamphlets and trade catalogues { 3½ in. by 6 in. / 6 in. by 9 in. / 9 in. by 12 in.

For specifications and letter paper, 8¼ inches by 10¾ inches. In connection with these standards it was decided that a standard practice should be to have the proper standard dimensions, and the word "standard" printed on the upper left-hand corner of title page or cover whenever practicable.

MASTER CAR BUILDERS' STANDARDS AND RECOMMENDED PRACTICE. A variety of standard details for cars, or recommendations in respect to them, which have been adopted and promulgated by the Master Car Builders' Association, and are separately described in this volume. By a letter ballot, cast in 1893, the standards of the Association prevailing at that date were modified—

First—By abolishing certain standards because they had either become obsolete or nearly so, or because they were simply forms of gages for shop use to produce certain other standard forms, and it was believed that such gages were not essential as standards of the Association, and it had been ascertained that they were not generally used.

The old standards thus abolished were:

Wheel diameter testing gage.
Wheel flange and journal gage.
Wheel bore testing gage.
Wheel boring, use of six dogs.
Journal length and diameter gage.
Journal shoulder and centering gage.
Journal distance gage.
Guard rail gage. (Made standard again in 1894.)
Attachments and dimensions of drawbars.
Train pipe fitting for steam heat.

Second—By ordering that the three items formerly printed at the end of the standards, namely:

Storage of line cars on foreign roads,
Dictionary of terms,
Entertainments,

be printed with the proceedings as heretofore, but not among the standards.

Third—By dividing the remaining standards into:

(*a*) Standards of the Association.

(*b*) Recommended Practice, as follows:

(*a*) Standards:

Journal Box and Details, Journals, 3¼ in. x 7 in. FIGS. 4238-4260.
Journal Box and Details, Journals, 4¼ in. x 8 in. FIGS. 4261-4283.
Journal Box and Details, Journals, 5 in. x 9 in. FIGS. 4373-4390.
Journal Box and Details, Journals, 5½ in. x 10 in. FIGS. 4391-4424.
Journal Bearing and Wedge Gages, Journals, 5 in. x 9 in. and 5½ in. x 10 in. FIGS. 4394-6, 4425-27.
Axles. FIGS. 4284-87.
Form of Wheel Tread and Flange. FIG. 4292.
Wheel Circumference Measure. FIGS. 4288-91.
Brake Head and Shoe. FIGS. 4295-4302.
Specifications for Brake Shoes, which see.
Brake Beam. FIGS. 4293-94.
Air Brakes.—General Arrangement and Details. FIGS. 4303-36, 4341-44.
Pedestal for Journal, 3¼ in. x 7 in. FIGS. 4337-40.
Automatic Coupler. FIGS. 4345-53.
Contour Line and Limit Gages for Automatic Coupler. FIGS. 4354-59, 4362.
Yoke or Pocket Strap for M. C. B. Couplers. FIGS. 4360-61.
Buffer Blocks and Location. FIGS. 4363-65.
Terms and Gaging Points for Wheels and Track. FIG. 4367.
Guard Rail and Frog Wing Gage. FIG. 4369.
Distance Between Backs of Flanges of Car Wheels, which see.
Standard Reference Gage for Mounting and Inspecting Wheels and Wheel Check Gage. FIGS. 4366 and 4368.
Wheel Flange Thickness Gage. FIGS. 4371-72.
Height of Couplers, which see.
Screw Threads, Bolt Heads and Nuts, which see.
Uniformity of Section for Car Sills. See, Sills.
Square Bolt Heads, which see.
M. C. B. Reports, Pamphlets, Specifications, Catalogues, etc. See, M. C. B. Reports.
Siding, Flooring, Roofing and Lining. FIGS. 4428-32.
Arch Bars and Column Bolt for 80,000-lb. Capacity Cars. FIGS. 4433-43.
Adjusting Height of Couplers. See, Height of Couplers.
Stenciling Cars. See, Stenciling.
Passenger Car Pedestal for Journal 4¼ in. x 8 in. FIGS. 4468-75.
Passenger Car Journal Box and Contained Parts for Journal 4¼ in. x 8 in. FIGS. 4976-78.
Air Brake Repair Card, which see.
Protection of Trainmen. FIGS. 4444-67, 4479-80.
Mounting Wheels. FIGS. 4481-89.

(*b*) Recommended Practice:

Specifications for 33 in. Cast Iron Wheels. See, Wheels.

Specifications for Iron Axles. See, Axles.
Specifications for Steel Axles. See, Axles.
Limit Gages for Round Iron. See, Limit Gages.
Check Chains, which see.
Marking Cars. See, Lettering.
Air Brake and Signal Instructions.
Platform Safety Chains, which see.
Marking Fast Freight Line Cars. FIGS. 4551-53.
Attachment of Couplers to Cars. FIGS. 4490-4506, 4537-50.
Uncoupling Attachments for M. C. B. Couplers. FIGS. 4507-28.
Journal Bearing and Wedge Gages. FIGS. 4556-75.
Safety Chains for Freight Cars. FIGS. 4532-36.
Minimum Thickness for Steel Tires. FIG. 4531.
Loading Poles, Logs and Bark on Cars. FIGS. 4576-4651.
Mounting Wheels, which see.
Air Brake Appliances. See, Air Brakes.
Air Brake Tests, which see.
Box Car Side and End Door Fixtures. FIGS. 4668-4704.
General Dimensions of Cars with Steel Underframing. See, Steel Underframe.
Springs and Spring Caps for Freight Trucks. FIGS. 4652-58, 4664-67.
Collection of Salt Water Drippings. FIGS. 4529-30.
Twist Gage for New Couplers. FIGS. 4659-63.
Gage for Worn Couplers. FIGS. 4705-06.
Specifications for M. C. B. Couplers. See, Couplers.
Coupler Label. FIGS. 4707-10.
Drop Test Machine. FIGS. 4711-13.
Specifications for Air Brake Hose. See, Brake Hose.
Rules for Examination of Car Inspectors. See, Examination.
Cleaning Air Brakes, which see.

These Standards and this Recommended Practice are given under their respective heads in these pages as modified by letter ballot on these or other subjects, and revised up to 1902.

New drawings of the Standards and Recommended Practice have been made on sheets of uniform size, and lithographed and printed on transparent paper so that blue prints may be taken from them; such sheets are for sale by the Secretary of the M. C. B. Association in connection with pamphlets containing explanatory text as given in the Proceedings. See, STANDARDS. RECOMMENDED PRACTICE.

MASTER CONTROLLER. FIG. 4835. See, CONTROL SYSTEM.

MASTER KEY. FIG. 2105. A key which commands many locks of a certain set, the keys of which are not interchangeable through the hollow rollers, coupling the middle ring of rollers to the outside rings each to each, which insures their keeping in line and working together.

MAT. FIGS. 2174-75. See, FLOOR MAT.

MATCH BOX HOLDER. FIG. 3471.

MATCH LIGHTER. FIGS. 2967, 3459-62. A MATCH STRIKER, which see.

MATCH SAFE. FIGS. 3455-56.

MATCH STRIKER. FIGS. 2967, 3459-62. A metal plate with a rough surface.

MATCH STRIKER FRAME. A metal frame for holding a piece of sand or emery paper.

MATTING. See, COCOA MATTING.

MATTRESS (Sleeping Cars). D, E, FIG. 1780, etc. In ordinary sleeping cars both mattresses are stowed away by day above the upper berth. In the boudoir cars they go in boxes under the seats.

MEAT TIMBERS (Refrigerator Car). The vertical and horizontal timbers inside the refrigerating chamber on which the meat is suspended. They are usually independent of the framework of the car and fastened to it with coach screws.

METAL SCREW THREAD. A form of screw thread used when both the male and female screws are made of metal. Metal threads are made of the same size as the spaces between them, whereas the spaces between wood screw threads are made wider than the projections. See also, SELLERS SYSTEM OF SCREW THREADS.

MICA CHIMNEY. (Pintsch System.) 109, FIG. 2536. A chimney for use on all center lamps, being placed immediately above the ring reflector, allowing a portion of the light to be directed toward the roof of the car. See, PINTSCH LAMPS.

MICROMETER GAGE. A general term for any form of gage giving very minute and exact measurements. There are several varieties; the most common is one with an accurate screw thread and an index to give the number of revolutions and fractions thereof.

MIDDLE BRAKE SHAFT BEARING. FIGS. 527-8.

MIDDLE CORNER PLATE. FIGS. 548-50, 580-2. See, CORNER PLATE.

MIDDLE DOOR PANEL. 11, FIGS. 1029-31. See, DOOR PANEL.

MIDDLE DOOR RAIL. 148, FIGS. 388-91; 6, FIGS. 1029-31. A horizontal bar intermediate between the top and bottom rails. See, DOOR FRAME.

MIDDLE LONGITUDINAL (English). American equivalent, intermediate sill. A part of the underframing supporting the body or floor, and in many cases transmitting the buffing and the draft strains.

MIDDLE OF AXLE. The portion of a car axle between the two sloping necks which come next to the wheel seat. See, AXLE. CAR AXLE.

MIDDLE SAFETY BEAM (Six Wheel Trucks). 52, FIGS. 3948-51. A beam attached to the two transoms to hold the center axle in case of breakage.

MIDDLE TRANSOMS (Six Wheel Trucks). 21, FIGS. 3948-51 and FIGS. 4051-53. The two cross pieces nearest the center in distinction from the two outside transoms. They are sometimes made of iron to allow the two swinging spring beams to be connected to each other by the bolster bridge.

MIGHTY MIDGET HEATER (Baker's). FIGS. 2240-52. A small heater for cars.

MILK CAR. A car for carrying milk in cans, usually built with platforms similar to baggage cars, and equipped with passenger car trucks. They are usually provided with tight doors, ice racks or boxes, and insulation.

MINE CAR. A small car for carrying minerals in mines, usually four wheeled, and provided with a dumping device by which the load may be quickly and completely discharged.

MINERAL WOOL. A substance having much the appearance which its name implies, manufactured from the slag of iron furnaces by throwing against it while in the molten state a strong blast of air. It is used for deadening in passenger cars and also largely as a non-conductor for coating steam pipes and boilers.

MINER DRAFT GEAR. FIGS. 1263-73.

MINIMUM THICKNESS OF STEEL TIRES. In 1894 a Recommended Practice was adopted for minimum thickness for steel tires of car wheels, to be 1 inch, to be measured normal to the tread and radial to the curved portions of the flange through the thinnest part within 4¼ inches from the back of the flange; the thickness from the latter point to the outer edge of tread to be not less than ½ inch at thinnest part as shown in FIG. 4531.

A further practice was adopted of cutting a small groove, as shown in the outer face of all tires when wheels are new, at a radius ¼ inch less than that of the tread of tire when worn to the prescribed limit, to facilitate inspection.

MIRROR (for Wash Rooms of Sleeping Cars). A looking glass.

MIRROR FRAME. FIGS. 2916, 2918. A frame for a looking glass.

MIRROR FRAME SPRING. A mirror sash holder.

MIRROR GUARD (Wash Rooms, etc., of Sleeping Cars). A fender of various forms to protect mirrors. Usually nickel plated bars across the face, and a tray for towels or brush and comb at the bottom of the mirror.

MIRROR SASH. A frame of a mirror which covers a lamp alcove in the side of a car. It slides up and down like a window sash.

MISCELLANEOUS FURNISHINGS. FIGS. 2854-3016.

MOLDING. FIGS. 420-32. 1. "A mode of ornamentation by grooved or swelling bands or forms, following the line of the object."—Knight. Small moldings are often termed beads, and also fillets. A cove molding is one of concave section. There are a great variety of other special technical terms for different forms of moldings. Moldings are either straight or WAVED, which see. See also,

DECK EAVES MOLDING.
EAVES MOLDING.
PLATFORM HOOD MOLDING.
WINDOW COVE MOLDING.
WINDOW MOLDING.
WINDOW SILL MOLDING.

2. (For Car Seats.) FIGS. 3268-79. Also called seat back bands or seat molding. A metal band to finish the edge of the seat back. Plush or leather covered strips are also used.

MOLDING JOINT COVER. A piece of wood or metal in some ornamental form for covering the joints of two pieces of molding. See, WINDOW MOLDING JOINT COVER.

MONARCH BRAKE BEAM. FIGS. 838-841. One of a number made of a 5 in. I-beam not trussed.

MONARCH COUPLER. FIGS. 1441-53.

MONITOR DECK SASH PIVOT AND RATCHET CATCH. FIGS. 3569-70. A device for regulating the opening of deck sashes by means of a small fixed ratchet plate in which a ratchet bolt engages, holding the sash fixed in any one of four different positions. See, DECK SASH PIVOT.

MONITOR TOP. A CLEAR STORY, OR UPPER DECK, which see.

MORGAN'S AUTOMATIC DECK SASH PIVOT. FIGS. 3554-57. A device for regulating the openings of deck sashes, the essential feature of which is the use of a double circular undulating ratchet, one attached to the sash and the other to a fixed part of the car, the two ratchets being pressed together by springs so as to admit of easy motion of the sash by hand at the same time that it is held in any position when released.

MORTISE LOCK. FIGS. 1919-20, 1924. "A lock adapted to be inserted into a mortise in the edge of a door, so as only to expose the selvage or edge plate."—Knight. See, LOCK.

MOTOR DRIVEN AIR COMPRESSOR (Air Brake). FIGS. 990-92. An air compressor driven by a motor for use on electric cars.

MOULD. See, MOLDING.

MOUNTING WHEELS. In 1896 it was decided by letter ballot that a gage for determining the center of the axle between centers of journal be used, and that all axles be carefully centered between centers of journals prior to mounting, and that a gage for locating the wheels equidistant from the center of the axle, as thus determined and shown in FIGS. 4481-89, should be used in mounting wheels.

In 1902 this gage was made a standard of the Association.

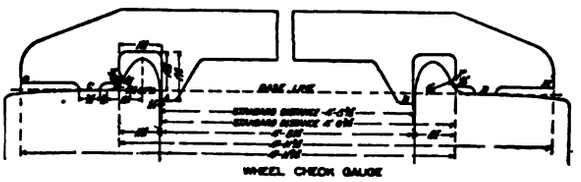
In 1897 the Recommended Practice for mounting wheels was modified by letter ballot by the omission of that part providing, among other things, that wheels with flanges worn to a thickness of 1⅛ inches or less should not be remounted, and the substitution therefor of the following:

First—That wheels with flanges worn to a thickness of 1 1-16 inches or less shall not be remounted.

Second—That the thickness of flanges of wheels fitted on the same axle should be equal and should never vary more than 1-16 inch.

Third—That in mounting wheels, new or second hand, the standard wheel check gage should be used in the following manner:

After one wheel is pressed into position place the stop "A" or "B" of the check gage against the inside of



the flange of the wheel with the thinner flange with the corresponding tread stop "C" or "D" against the tread of the wheel. Press the other wheel on the axle until the opposite tread stop comes in contact with the tread with the corresponding gage point "E" or "F" in contact with the outside of the thicker flange.

MOVABLE FOOT REST (Car Seats). 23, FIGS. 3169-91. More properly, simply FOOT REST, which see; in distinction from fixed foot rails under the seats.

MUCK BAR. "Bar iron which has passed once through the rolls. It is usually cut into lengths, piled, and rerolled."—Knight. Certain grades of iron axles are made directly from muck bars and contain no scrap. See, AXLE.

MUFFLER (Eames Vacuum Brake). A device to render noiseless the emission of steam at the ejector when brakes are applied. It is simply a lot of beads or shot, through the interstices of which the steam forces its way.

MULEY AXLE. An axle without collars.

MULLION. A slender bar between panes of glass or panel work. See, DOOR MULLION. 2, FIGS. 1029-37. WINDOW BLIND MULLION. WINDOW MULLION.

MULTIPLE CIRCUIT DRUM SYSTEM. (Consolidated Car Heating Co.) FIGS. 2288-90. A system of car heating by circulating hot water heated by steam from the locomotive by means of a drum, placed longitudinally beneath the floor of the car, as shown. The piping in the car is connected from this drum in a number of circuits so that there is a quick flow of water through the different circuits and all parts of the apparatus are run at practically the same temperature. Its time of circulation is about one-sixth of the time of circulation of a heater in which piping is arranged in series.

The advantages claimed for multiple circuits are: 1, a low pressure of steam; 2, no limit, practically, to amount of heating surface, that can be supplied; 3, a more uniform heat is supplied to all parts of car; 4, short circuit of hot water circulation.

The circulating system, as shown, is also connected with a fireproof heater, which may be used when steam is not available, and in those States where the law permits a stove or heater.

MULTIPLE CONTROL SWITCH. FIG. 4882. See, WESTINGHOUSE ELECTRO-PNEUMATIC SYSTEM OF CONTROL.

MUNTIN. A corruption of the word mullion, chiefly used in England. See, END STANCHION OR MUNTIN.

MUNTON COUPLER. FIGS. 1473-82.

MURPHY'S AMERICAN CAR ROOF. FIG. 1769. An outside metallic roof.

MURPHY'S IMPROVED WINSLOW CAR ROOF. FIG. 1768.

N

NAIL. "A small pointed piece of metal, usually with a head, to be driven into a board or other piece of timber, and serving to fasten it to other timber."—Webster.

The common nails of commerce are divided into CUT NAILS, and CLINCH NAILS, and WIRE NAILS, which see. They are distinguished in size by the number of pennies, as 10d., 20d., etc., nails. See also, PANEL PIN (English).

NAILING STRIP. 194 and 194a, FIGS. 159-69. A strip of wood laid over a metal underframe and bolted to it, to which are nailed the floor boards.

NAILING STRIP BRACKET. 193, FIGS. 159-69. A bracket secured to the sills to hold in place the NAILING STRIP, which see.

NAILING STRIP CROSS TIES. 196, FIGS. 159-69. Light members of a metal underframe extending across the sills for the purpose of supporting the nailing strips.

NAME PANEL. A panel, usually of elliptical form, on the outside of a passenger car body below the windows, on which the name or number of the car is painted.

NAME PLATE. See, DOOR NAME PLATE and NOTICE PLATES.

NARRAGANSETT CAR (Electric). FIGS. 4736, 4757-58. A type of long double truck open car having a peculiar Z bar side sill construction which gives a double side step or running board without decreasing the width of the car body with a given clearance limit.

NARROW GAGE. The distance in the clear between the heads of the rails of a railroad when less than 4 ft. 8½ in. See, GAGE.

NATIONAL ADJUSTABLE JOURNAL BEARING. FIG. 4099.

NATIONAL BRAKE LEVER JAW. FIGS. 881-84. A malleable iron substitute for the forged jaws on brake lever connections.

NATIONAL COUPLER. FIGS. 1397-1400.

NATIONAL DEAD LEVER GUIDE. FIGS. 878-80. A malleable iron guide for the dead lever similar in shape and dimensions to the usual form of wrought iron.

NATIONAL HOLLOW BRAKE BEAM. FIGS. 832-835. A brake beam consisting of a hollow tube 2 or 2½ ins. diameter, trussed by a rod passing through cast end pieces and over a king post, through which the brake lever passes.

NATIONAL JOURNAL BOX. FIGS. 4112-22.

NATIONAL PUSH ROD END. FIGS. 876-77. A malleable iron jaw for the end of the bra e cylinder push rod.

NATIONAL SAFETY FREIGHT DOOR LOCK. FIGS. 2093-96. A lock for freight car doors designed to prevent the opening of the door without breaking the seal by removing the hasp staple. The staple plate and seal pin are riveted together so that the pin cannot be lost.

NATIONAL WINDOW AND CURTAIN FIXTURES. FIGS. 3708-10.

NECK OF AXLE. The sloping portion of a car axle just inside of the hub of the wheel.

NECK DOOR BOLT. FIG. 1892. See, DOOR BOLT.

NEEDLE BEAM. "(Civil Engineering.) A transverse floor beam of a bridge, resting on the chord or girders, according to the construction of the bridge."—Knight. The term seems, however, to be more particularly used in bridge construction, as applying to the cross pieces of queen post trusses, supporting the floor and themselves supported by the truss. Hence (Car Building), 22, FIGS. 159-69; 26, FIGS. 360-72. The cross frame tie timber, a transverse timber bolted to the under side of the longitudinal sills and floor timbers of a car body between the bolsters, and to which the body king or queen posts, or truss blocks, are attached when truss rods are used under a car body.

The terms, cross frame tie timber, body transom cross bearer and needle beam are all more or less used, but cross frame tie timber seems more precisely descriptive of its character than any other.

NEEDLE VALVE (Pintsch Lamp). 398, FIGS. 2605-21.

NEST SPRING. A spiral spring with one or more coils of springs inside of it. See, SPIRAL SPRING.

NETTING. FIGS. 2987, 3002-03. See, BASKET RACK NETTING.

NEW YORK AIR BRAKE. FIGS. 959-985. Air brake apparatus sold by the New York Air Brake Company. The devices sold are very similar to the Westinghouse equipment, and in most cases interchange with it. The apparatus was calculated to work in the same train with Westinghouse equipment, and to that end nearly all the parts are the same as those made by the Westinghouse Air Brake Company.

NIGHT LATCH. FIGS. 2062-63, 2073-78, etc. A spring door lock which requires a key to be opened from the outside, but which can be opened from the inside without one. A spring door lock. See, LATCH.

NIPPLE. 1. In mechanics "a small rounded perforated protuberance, as the nipple of a gun."—Knight. It is often used, however, in a more general sense.

2. (Pipe Fittings.) FIGS. 2282, 2284. A short wrought iron pipe with a screw thread cut on each end, used for connecting couplings, tees, etc., together or with some other object, as a tank or heater. See, AUXILIARY RESERVOIR NIPPLE. BRAKE HOSE NIPPLE.

NORTON BALL BEARING JACK. FIGS. 2972-77. A screw jack having ball bearing pivots.

NORWOOD SIDE BEARING AND CENTER PLATE. FIGS. 4130-37. An anti-friction device using hardened steel balls rolling in semi-circular grooves and bearing on a hardened flat plate.

NOSING. 1. (Of a Lock.) A KEEPER, which see.

2. (Of Steps.) The part of a tread board which projects beyond the riser, hence the metallic moldings used to protect that part of the tread board. The nosings should be distinguished from the step facings.

NOTICE PLATE. FIGS. 2108-33. Varieties are the platform notice plate, saloon notice plate, etc. See, NAME PLATE.

NOZZLE. See, TANK NOZZLE.

NUMBER. FIG. 3444-48. See, BERTH NUMBER.

NUMBER PANEL. See, NAME PANEL. Now rarely used on modern cars. The number is simply painted on between horizontal bars.

NUT. "A small block of metal or wood containing a concave or female screw."—Webster. Nuts take their name from the bolts, rods or other parts to which they are attached. They are usually either square or hexagonal. A SPANNER NUT, which see, is one with eight or more sides. They are usually more truly couplings than nuts, properly so called, which screw on to a bolt or rod. See, SCREW THREADS.

O.

"O. & C." CAST STEEL BOLSTER. FIGS. 773-76.

"O. & C." DRAFT GEAR. FIGS. 1274-79. A spring gear in which leaf springs are used instead of spiral springs. It is claimed that the device has capacity for absorbing by friction some of the shock by means of the friction between the plates as they move over each other.

OAKETTE. An artificial leather used for curtains and upholstering. It is made by coating a cloth fabric with a compound which gives it the appearance of leather.

OBLIQUE CLOSET HOPPER. FIG. 3094. See, CLOSET HOPPER.

OBSERVATION END OF A CAR. FIG. 88, etc. A car, one end of which it fitted with an extended platform and large windows, from both of which passengers may get a good view of the country and especially of the track and structures. They are coupled at the end of the train and the observation end is a feature of many officers' cars.

OBSERVATION SLEEPING CAR. FIGS. 88, 95, 132. A sleeping car with an OBSERVATION END, which see.

OFFICERS' CAR. A car for the private use of the higher officers, directors, etc., of railroads in traveling over their lines. They are usually provided with kitchens. They are sometimes very elaborate and costly—sometimes merely business cars. A pay car is a special variety, found on nearly all roads from 300 to 600 miles long.

OFFSET BUTT HINGE. FIG. 1962.

OIL AXLE BOX (English). A journal box in which oil is used instead of grease as a lubricant. The oil is fed to the under side of the journal by means of a worsted pad held lightly against the journal by spiral steel springs. See, AXLE BOX, and GREASE AXLE BOX.

OIL BOX. A JOURNAL BOX, which see.

OIL CAR. A car made especially for the transportation of mineral oil. Some oil cars are built for carrying barrels of refined oil. Crude oil and refined oil are usually carried in TANK CARS, which see, FIGS. 67-68 and 325-42, or in combination box and tank cars.

OIL CELLAR. A cavity in the lower part of some exceptional forms of journal boxes for collecting the oil and dirt which run off the axle at the dust guard. The oil cellar is below the space occupied by the axle packing.

OIL CUP. (Air Cylinder of Westinghouse Pump.) A small metal cup attached to an air pump to hold oil for lubricating an air piston.

OIL LAMP. FIGS. 2690-2710. A lamp for burning oil.

OPAL DOME (Pintsch Gas Lighting). FIG. 2550. May be used on any center lamp.

OPAL GLOBE. (Pintsch Gas Lighting.) 102, FIG. 2549. It is for use on bracket lamps of all descriptions.

OPEN DOOR STOP. 71, FIGS. 159-69 and FIGS. 537-8. A block of iron or wood fastened to the side of a freight car to prevent a sliding door from sliding too far when opened.

OPEN EXCURSION CAR. An open car with curtained sides for short suburban runs to summer resorts.

OPEN PLATE WHEEL (Street Cars). FIG. 4223. A light cast iron single plate wheel, with openings cast in the plate between the ribs. See, WHEEL. CAR WHEEL.

OPEN RETURN BEND (Pipe Fittings). FIG. 2276. A short cast or malleable iron U-shaped tube for uniting two parallel pipes. It differs from a close return bend, FIG. 2275, in having the arms separated from each other.

OPEN WAGON (English). American equivalent, four wheeled gondola car. A vehicle with sides and ends from 6 in. to 5 ft. high, and having no roof; suitable for the conveyance of freight. A TARPAULIN, which see, is used to protect the freight from the weather. See also, WAGON.

OPENER. See, DECK SASH OPENER. VENTILATOR OPENER.

OPERATING HEAD. FIG. 4844. See, WESTINGHOUSE ELECTRO-PNEUMATIC SYSTEM OF CONTROL.

OPERATING VALVE (Westinghouse Traction Brake). FIGS. 993-94. The valve for controlling the brakes. Corresponds to the engineer's brake valve.

ORE CAR. FIGS. 44, 291-95, 304-07. A car made especially for carrying iron or other ores. Ordinarily gondola cars, which are sometimes lined with sheet iron, and drop bottom and tip cars are also used for this purpose. They are shorter than the ordinary hopper car, with a steeper incline to the hopper to permit ready dumping of the load.

ORMOLU. Literally, ground gold, a style of bronzing metallic surfaces.

ORNAMENTAL CARLINES. A recent innovation of breaking up the interior of a car into sections by very heavy, prominent and highly decorated compound carlines.

OTTOMAN. A carpet covered movable cushion serving as a foot rest.

OUTER DOUBLE FLOOR, OR FLOOR UNDER LINING (English). American equivalent, deafening ceiling. In a carriage, planking attached to the under side of the framing and floor of the body. The space between it and the true floor is generally filled with sawdust.

OUTER INTERMEDIATE SILL. 3a, FIGS. 159-69, 185-95, 360-72; 4, FIGS. 246-50. A term applied to the two intermediate sills next to the side sills, to distinguish them from the two intermediate sills adjacent to the center sills, which are the inner intermediate sills.

OUTSIDE BODY TRUSS ROD. When two or more truss rods are used under each side of a car body those farthest from the center are called outside body truss rods, in distinction from the inside truss rods.

OUTSIDE CASING (Heaters). FIG. 2250. An outside shell made of Russia iron or sheet steel and bent and riveted into the form of a cylinder or a frustum of a cone.

OUTSIDE CORNER PLATE (English). A plate placed outside of the body, securing the side and ends together; made a continuous plate, or in several knees, each 2½ in. deep.

OUTSIDE CORNICE (English). See, SIDE GUTTER.

OUTSIDE END PIECE (of Wooden Truck Frame). FIGS. 3817-18. The cross piece next to the end of the car, in distinction from the inside end piece.

OUTSIDE END SILL. FIG. 13. A type of box car framing in which the end sill projects outside the sheathing, forming a narrow platform at the ends of the car. It is not the general practice.

OUTSIDE HUNG BRAKE. FIGS. 823-24. Brake shoes and beams attached to the outside of the wheels of a truck. They are sometimes hung from the car body, but usually the truck frame is extended and the brakes are hung from it. When hung between the wheels it is an inside hung brake.

OUTSIDE PANEL. 67, FIGS. 360-72, 388-91. A panel in the outside of a passenger or street car under the windows. Those between the windows are called outside window panels. Above the windows comes the frieze, or letter board. Street cars have lower outside panels, below the outside panels proper. In standard car construction outside paneling between and below the windows has been superseded by sheathing.

OUTSIDE SILLS. The side sills. See, SILLS.

OUTSIDE TRANSOMS (Six Wheeled Trucks). 22, FIGS. 3948-51. The two transoms farthest from the center of the truck, in distinction from the middle transoms.

OUTSIDE WHEEL BARS (Iron Six Wheel Truck). An iron substitute for wooden wheel pieces.

OUTSIDE WHEEL PIECE PLATE. 11, FIGS. 3735-3951. An iron plate fastened to the outside of a wheel piece to strengthen it. There are two when any are used, outside and inside. They are usual on six wheel trucks, and frequently met on late construction of four wheeled trucks.

OUTSIDE WINDOW PANEL. 68, FIGS. 360-72. See, OUTSIDE PANEL.

OUTSIDE WINDOW SILL. 77, FIGS. 360-72, 388-91. A horizontal piece of wood or iron under a window on the outside of a car, and on which the sash rests.

OUTSIDE WINDOW STOP. A wooden strip attached to a window post on the outside of a sash to hold the latter in its place. Often called a BEAD, which see.

OVAL BRAKE BEAM. FIG. 869. An untrussed beam, in which a tube of oval shape is used, the long axis being set perpendicularly to the face of the wheel.

OVERHANG (of a Roof). The projection beyond the sides.

OVERHANG (of a Car Body). That part of a car body between the body bolster and end, and which is not supported by the body truss rod.

OVERHANG BRACE ROD (Passenger Car Framing). 167 and 220, FIGS. 360-72. A truss rod extending over the side sills and between the sheathing and wainscoting. Its office is to sustain and stiffen that part of the underframe which overhangs at the ends and outside the bolsters. Usually it passes from the end of the side sill diagonally up to the belt rail and over a queen post, called the overhang brace rod strut, and then along close under the belt rail to the other end of the car and down to the end of the side sill. Frequently they extend diagonally down on both sides of the overhang brace rod strut (which then becomes a king post), and diagonally through the sill. The overhang brace rod strut stands upon the sill directly over the body bolster. It is sometimes called an inverted truss rod, a continuous body brace rod, body chain rod, and a hog chain rod.

OVERHANG BRACE ROD STRUT. 221, FIGS. 360-72 and FIGS. 718-20. A vertical cast or wrought iron strut seated upon the side sill directly over the body bolster, and acting as a king post or queen post for the overhang brace rod. See, OVERHANG BRACE ROD.

OVERHANG TRUSS. Shown in FIG. 373. An inverted truss, forged or cast, the office of which is to support and stiffen the overhang ends of a passenger car under frame. It is used only in very long and heavy cars, and is intended as an auxiliary to the overhang truss rod. Its use is confined to palace and sleeping cars.

OVERHEAD DOOR CATCH, OR HOOK (Grain Door). C, FIGS. 1087-1106.

OVERHEAD EQUALIZER SPRING (Pullman Vestibule). 23, FIGS. 1784-86. A face plate buffer spring is a more appropriate term, as it corresponds to the side stem buffer spring of a platform equipment. It affords the spring pressure on the face plate stem, which is attached near the top of the face plate, and keeps it forced out.

OVERHUNG DOOR. A sliding door which is hung from or supported on a rail above the door. If the door is supported by a rail below it is called an underhung door. Overhung doors are almost universal for freight cars. See, DOOR HANGER. CAR DOOR HANGER.

P

"P. AND S." CAR SEATS. FIG. 3176, etc. A car seat patented by Pottier & Stymus and made by Heywood Bros. & Wakefield.

PACKAGE RACK (Passenger Cars). FIGS. 2987-3012. A small rack analogous to basket racks.

PACKING. JOURNAL PACKING, which see.

PACKING BLOCKS. Rectangular blocks gained into the center sills and draft timbers, and serving the purpose of connecting them firmly together longitudinally. The term is borrowed from bridgework, in which the form of packing block is very common. They are called key blocks.

PACKING EXPANDER (Westinghouse Brake). A spring wire ring for spreading out the leather packing of the piston so as to make it fit air tight. See, PISTON PACKING EXPANDER.

PACKING GLAND. See, PISTON ROD.

PACKING LEATHER. 1. (Of Journal Boxes.) A dust guard is sometimes called packing leather.

2. (Westinghouse Brake.) A ring of leather used in connection with brake cylinder pistons to make an air tight joint. When so used it is always accompanied with a packing leather expander. A packing leather for a piston rod is called a cup leather, and is compressed by a piston spring. See, PISTON PACKING LEATHER. PISTON ROD PACKING LEATHER.

PACKING NUT (Westinghouse Brake). See, PISTON ROD PACKING NUT.

PACKING NUT WRENCH (Westinghouse Brake). See, WRENCH.

PACKING RING. 1. (Westinghouse Brake.) 67, FIGS. 893-94, etc. See, PISTON PACKING RING.

2. (Hose Coupling.) An india rubber ring in a coupling case, which makes a tight joint between the two parts of the coupling.

3. (Triple Valve.) 5, FIG. 910.

PADLOCK. FIG. 2101. A loose lock having a semi-circular shackle jointed at one end so that it can be opened, the other end of the link being locked when desired by the entrance of the sliding bolt into it. Such locks are used to secure a hasp or the like on a staple or similar device by passing the link through the staple. A spring padlock is one which snaps shut and locks by pressure only. A dead padlock has no springs.

PAIGE STEEL TIRED WHEEL. FIGS. 4178-81. A type of steel tired wheel, the hub and skeleton (wheel center) being in one piece, and the tire secured thereto by front and back face plates, hub bolts and tire bolts. It has no retaining ring, although the company does make a wheel whose tire is fastened by retaining rings. FIGS. 4182-83.

PAINTING (of Passenger Cars) consists usually of the priming, rough stuff or scraping filling coats, color coats and varnishing. The care and expense devoted to the process and the order and number of the various coats are often varied, but the following is among the most approved processes, and the order of the coats and the time required for each to dry are about as follows:

	Hours.
Priming with drier	24
Scraping filling coat (2 coats)	48
Color coats (3 coats)	72
Color and varnish	24
Striping	24
Finishing varnish (2 coats)	48
Total 10 days, or hours	240

A process known as "Murphy's A, B, C System" is also used, A being a liquid used for priming or first coat on new wood; B a liquid heavier in body than A, which is used for the second and third coat. C is a still heavier liquid, applied over B, and when thoroughly dry and hard is rubbed down to a smooth surface with water and block pumice stone, leaving the surface ready for the color coat.

Other systems are the "lead and oil" and the "M. J. S." The former being a very old method and the latter a very simple method, consisting simply of a priming or filling coat, followed by a surface coat that is rubbed down with pumice stone or sandpaper, preparatory to the color coat.

PAIR OF TRUCKS. A pair of trucks means two truck frames, each with two or more pairs of wheels, etc., complete for an entire car, and does not mean one truck frame with wheels and axles for one end of a car only.

PAIR OF WHEELS. This term is used to designate two car wheels fitted on one axle, including the axle.

PALACE CAR. An extravagant term used to designate sleeping, drawing room, parlor and chair cars, which are fitted up with more than the ordinary amount of ornament and elaborate finish and furniture.

PALACE STOCK CAR. An extravagant general term applied to cars designed for carrying stock with less injury and greater comfort than the common stock car. Cars built after the plans of so-called palace stock cars are in general use, and are shown in FIGS. 59-62. They are provided with apparatus for feeding and watering, and those for very valuable stock have separate stalls partitioned off.

PAN. 1. (Refrigerator Cars.) The ice pan.

2. (Howard's Water Closet.) FIGS. 3089-90. The basin forming the bottom of the bowl, so constructed that it is only brought into position and filled with water on raising the lid.

PANEL. 1. A board inserted in the space left between the stiles and rails of a frame or between moldings. Sometimes metal plates are used for this purpose. Door panels in passenger cars are usually only the middle and lower or twin door panels. The upper door panel is usually of glass. Window panels come between the windows, and are distinguished as outside and inside. Wainscot panels come below the windows, between the upper and lower wainscot rails. Other interior panels are deck side panels and end panels, the latter sometimes called ventilator panel, and the end roof panel over the door. The exterior panels are the end panel below the windows and the end window panel alongside of the window. A name panel is now quite obsolete. In street cars additional panels to those above named are an upper end panel, which also sometimes occurs in passenger cars; a lower outside panel or

concave below the outside panels proper; inside frieze panels, end seat panels and door case seat panels and top panels.

2. (Of a Truss.) The space between two vertical posts or braces and the two chords of a truss.

3. (English.) In a carriage, the outside sheathing of the body. Teak and mahogany are generally used for this purpose in England, and sheet iron on the Continent of Europe. See, BOTTOM DOOR PANEL. END PANEL. QUARTER LIGHT PANEL.

PANEL CEILING. Properly, any form of ceiling divided up into panels, but in popular custom used as synonymous with wood ceiling, which is always divided into panels, in distinction from a head lining of canvas, lignomur, etc.

PANEL FURRING. 59, FIGS. 388-91. Horizontal bars or strips of wood between the posts of a passenger car, and to which the outside panels are nailed. When a strip is made continuous and extends from one end of the car to the other, and is notched into the posts, it is called a panel rail. Window panel furring is included in the general term, and is that coming between the window posts.

PANEL LAMP. An ALCOVE LAMP, which see.

PANEL PIN (English). A small, headless nail of copper, brass or iron, used to secure the outside sheathing (panel) of a passenger car to the framing of the body.

PANEL RAIL. 66, FIGS. 388-91. See, PANEL FURRING or SHEATHING FURRING.

PANEL STRIP. A narrow piece of wood or metal with which the joint between two panels, or a panel and a post, on the outside of a car, is covered.

PANEL WASHER. The washers of the transverse floor timber tie rod of a street car.

PANTASOTE. A substitute for leather, and in extensive use for upholstering and decorating cars and steamships. The material was first made by R. P. Bradley, a chemist, and the ingredients are a secret. That it contains rubber or any animal substance is denied. It is made by sheeting two or more pieces of cloth or canvas together, with the warp running in different directions, to give strength. The sheet making the leather side is passed between heavy rollers many times, and each time it receives a very thin coat of pantasote material, and this is kept up until the cloth or canvas is literally saturated and coated. The color is added to the pantasote material and is incorporated into the fabric. It is very like leather, and is not readily distinguished from it.

PAPER CASE CASTING. FIG. 3082. A cast side or bracket frame for a paper case in postal car.

PAPER HOLDERS. FIGS. 3106-07. (Which take rolls of closet paper.) See, PAPER HOOK.

PAPER HOOK (for Saloons). FIGS. 3108-09. A hook for carrying closet paper in sheets. A carrier for perforated continuous roll paper is in larger and increasing use. FIGS. 3106-07.

PAPER SEAL HOLDER. A style of seal holder (of which several patterns exist) in which a sheet of paper or printed label is used to protect the lock against unauthorized opening. The paper is usually protected by glass.

PAPER WHEEL. More properly, Allen Paper Wheel. FIGS. 4152-53. A car wheel with a steel tire and a center formed of compressed paper held between two plate iron face plates. It is in general use. The compressed paper can be turned and polished like wood.

PARALLEL BRAKE HANGER. 122, FIGS. 3781-3951. See, BRAKE BEAM ADJUSTING HANGER.

PARALLEL BRAKE HANGER CARRIER. See, BRAKE BEAM ADJUSTING HANGER CARRIER.

PARALLEL BRAKE HANGER EYE. See, BRAKE BEAM ADJUSTING HANGER CLIP OR EYE.

PARCEL NET (English). American equivalent, basket rack. In a carriage, a netting placed transversely above the seats for the purpose of carrying light baggage, parcels, etc. The front edge is attached to a wooden bar called the parcel net rod, which is supported by a bracket.

PARCEL NET BRACKET (English). See above.

PARCEL NET ROD (English). See above.

PARCEL RACK. See, BASKET RACK.

PARCEL VAN (English). American equivalent, express car. A closed vehicle adapted to run on passenger trains and to carry parcels and packages, rather than passengers' baggage. Such business in England is done by the railway companies themselves, and not by separate corporations.

PARLIAMENT HINGE. FIG. 1946. See, HINGE.

PARLOR CAR. FIGS. 89-91, 135. See, DRAWING ROOM CAR. The names parlor car, drawing room car and chair car are all used somewhat indiscriminately, but chair car ordinarily refers to a parlor car with adjustable or reclining chairs, for riding in which no extra fare is charged. Parlor and drawing room cars are usually run by separate companies. See, BAY WINDOW PARLOR CAR.

PARLOR CAR CHAIRS. FIGS. 3157-65, 3181, 3225, etc. The most common type of chair for parlor cars is a simple arm chair revolving on a pivot which enters a fixed pedestal.

PARTING BEAD, OR PARTING STRIP. A long thin piece of wood which acts as a distance piece between two objects, as a window and a window blind. See, SASH PARTING STRIP.

PARTING RAIL (of Door Frame). 7, FIGS. 1029-31. A vertical rail between the bottom and middle or middle and top rails of a door or partition, dividing a panel into twin panels.

PARTITION (English). A vertical division dividing the interior of the body into separate compartments, generally extending completely across the vehicle from side to side, and from floor to roof, but occasionally made to extend only some four or five feet from the floor, leaving a clear space between the top and the roof. This practice is, however, going out of favor.

PARTITION STOP (for Door Holder). FIGS. 2136-37. So called in distinction from a floor stop, with which a door holder engages.

PASSENGER CAR OR COACH. FIGS. 69-111, 360-74; (Framing), FIGS. 380-87; (Interior Finish), FIGS. 399-439, (Cross Sections), 392-98. Literally, a car used for carrying passengers, but in popular practice restricted to ordinary vehicles for day travel, in distinction from sleeping cars, and sometimes in distinction from the more luxurious PARLOR CARS, DRAWING ROOM CARS or CHAIR CARS (which see), as well. Passenger cars are also very commonly termed day coaches or first class coaches. Second class coaches are very rarely run, although there are large numbers of emigrant cars. A smoking car is usually attached to all trains, and holders of second class tickets or tickets bought at reduced rates are often required to ride in the smoking car. See, CAR. COACH.

PASSENGER CAR TRUCK. FIGS. 3781-4056. A truck for carrying a passenger car body. Such trucks are usually wooden frame and have two sets of springs—bolster springs under the truck bolster between the two truck frames and equalizer springs attached to the outside truck frames. They always have swing bolsters. The wooden truck frames are usually reinforced with iron plates, especially for six wheel trucks, which latter are almost always used for sleeping and parlor cars. Other passenger cars usually have four wheel trucks. See, TRUCK. CAR TRUCK.

PASTING LACE (English). An ornamental woolen fabric, made in bands about ½ in. wide, and used to finish and cover the seams and joints in upholstering against the woodwork of a carriage round the quarter lights and front seat rail, and to form borders to the broad lace above the back squabs. It is fastened by tacks driven in

the tape edge, the main part being then turned over to hide the tacks, and pasted in position. See also, SEAMING LACE.

PAWL. 1. (For Brake Ratchet Wheel.) 103, FIGS. 159-69. "A pivoted bar adapted to fall into the notches or teeth of a wheel as it rotates in one direction, and to restrain it from back motion. Used in windlasses, capstans and similar machinery."—Knight.

In most of the English dictionaries ratchet is given as another name for pawl, but this is believed to be incorrect, according to present practice. See, RATCHET WHEEL.

PECKHAM TRUCK. FIGS. 4899-4908.

PEDAL ALARM GONG (Street Cars). A large bell, sounded by striking a stem, connected by a lever with the clapper, to warn teams and persons of the car's approach.

PEDESTAL. 1. 5, FIGS. 3735-3951. A casting of somewhat the form of an inverted letter U, bolted to the wheel piece of a truck frame to hold the journal box in its place, while permitting a vertical movement. The two projections of a pedestal are called pedestal horns, and the space between them a jaw, which is closed at the bottom by a JAW BIT, which see. In Great Britain pedestals are called axle guards on cars and horn plates on locomotives, and are there made of wrought iron.

2. (Revolving Chairs.) The stand by which the chair is supported; consists of three portions—base, column and seat frame.

PEDESTAL (M. C. B. Standard).

(For Journals 3¼ in. x 7 in.). FIGS. 4337-40. The pedestal shown was recommended in 1874. See Proceedings 1874, page 40; again approved as standard in 1881; see Proceedings 1881, pages 14, 15 and 27. Also approved by the Master Mechanics' Association in the same year. Again adopted as standard in 1893. Weight, 141 pounds.

(For Journals 4¼ in. x 8 in.). FIGS. 4468-75. In 1898 a Recommended Practice was adopted for passenger car pedestal for journal box with 4¼ by 8 inch journal, and was formerly shown on Sheet H. In 1901, as a result of letter ballot, this was changed to Standard, as shown.

PEDESTAL BOX. A JOURNAL BOX, which see.

PEDESTAL BRACE. 8, FIGS. 3735-3951. A diagonal bar or rod staying the lower end of a pedestal longitudinally. It is often combined into one piece with a pedestal tie bar to form a pedestal brace tie bar.

PEDESTAL BRACE TIE BAR. 8, FIGS. 3735-3951. A pedestal brace and a pedestal tie bar combined in one piece. See above.

PEDESTAL HORNS. See, PEDESTAL.

PEDESTAL JAW. It is closed at the bottom by a jaw bit. See, PEDESTAL.

PEDESTAL SPRING. A JOURNAL SPRING, which see.

PEDESTAL STAY ROD. 7, FIGS. 3735-3951; 167, FIGS. 349-52, FIGS. 3831-32. 1. A transverse rod connecting the pedestal tie bars on each side of a truck, so as to prevent them from spreading apart.

2. A similar rod connecting the pedestal tie bars on four wheel caboose cars.

PEDESTAL TIE BAR. 6, FIGS. 3735-3951, and FIGS. 3837-38. An iron bar or rod bolted to the bottom of two or more pedestals on the same side of a truck or car, thus holding or tying them together. The pedestal tie bar is to get a low truck. Sometimes it is given a half turn for additional stiffness. It is also sometimes combined with a pedestal brace to form a PEDESTAL BRACE TIE BAR, which see.

PEDESTAL TIMBER. 1. (Four Wheel Cabooses, etc.) 169, FIGS. 349-52. A longitudinal timber sometimes used on four wheeled cars, which is placed under the floor or alongside the sill and to which the pedestals are bolted.

2. 10, FIGS. 3781-3951. A term sometimes used to designate the WHEEL PIECE of trucks, which see.

PEDESTAL TRUCKS. FIGS. 3732, 3734, 3738-40, 3757-59, 3774-80. Trucks so called because the journal boxes are held in jaws or pedestals which are an integral part of the truck frame as distinguished from trucks using pedestals bolted to the truck frames.

PERCH. Another name for the draw timbers of a tip car, on which the floor is not directly built. The name comes from the perch of wagons connecting the front and hind running gear.

PERFECTED HEATER (Baker's). FIGS. 2221-39.

PERFECTION CAR SEAL OR SHACKLE. FIG. 3136.

PERFORATED RUBBER FLOOR MAT. FIG. 2175. Another style is the corrugated rubber floor mat.

PERFORATED VENEER. A form of seat covering which consists of three, and sometimes four, layers of wood veneering, glued together and perforated with holes for ornament and ventilation.

PHOSPHOR BRONZE. "A term applied to an alloy of bronze or brass, or to a triple alloy of copper, tin and zinc, which has been given special purity and excellence by skillful fluxing with phosphorus. It is supposed that the presence of phosphorus gives the tin a crystalline character which enables it to alloy more completely and strongly with the copper. Whether for this reason or not, the phosphor bronzes, when skillfully made, are greatly superior to unphosphorated alloys."—Thurston.

PIECE. See,

CENTER PIECE. END PIECE.
DISTANCE PIECE. WHEEL PIECE.

PILASTER. 1. (Architecture.) "A square pier, like a flat column built against a wall, and having cap and base."—Knight.

2. (Car Construction.) Any stick or timber fastened against another piece to serve merely as the supporting block or a cross piece.

3. (Sleeping Car.) An ornamental finish to the window posts on the inside of the car. 11, FIGS. 1778-83.

PILE DRIVER CAR. FIGS. 158, 353-56. A class of cars, one of which at least is kept upon most large railways, the details of which vary, but which are similar to the type shown. The essential features of a pile driver car are the swinging platform, or upper platform, carrying the cabin and framework upon which the leaders and hoisting engine and the accompanying gear are carried. The swinging platform is to enable piles to be driven at a considerable distance from the rails on either side. To enable the cabin to be swung through a wider arc, adjustable wings are fixed to the side of the car, which are removed when not required for use by the crane. The leaders are usually long enough to take a 35 to 40 ft. pile and swing upon leader trunnions, so that the leaders may be dropped back upon the roof of the cabin for transportation over the road. The hammers weigh from 4,000 to 4,500 pounds.

PILE HOISTING SHEAVE (Pile Driver Car). A wheel placed at the side of the main sheave, for use in hoisting piles. It projects a little further forward than the other, so as to swing the pile more easily clear of the leaders.

PILLAR. 1. "A kind of irregular column.

2. "A supporter; that which sustains or upholds; that on which some superstructure rests."—Webster. See, TRANSOM PILLAR.

PILLAR CRANE. A style of crane used on wrecking cars, having the mast supported from below, either by a mast pocket or a base plate. See, DERRICK.

PILLOW BOX (Sleeping Cars). 19, FIGS. 1778-83.

PIN. "A peg or bolt of wood or metal having many uses."—Knight. In railroad service the word, when used alone, commonly means a coupling pin. See also,

BRAKE BLOCK PIN. LATERAL MOTION SPRING PIN.
CENTER PIN. PLATFORM LEVER PIN.
DOOR PIN. PUSH BAR PIN.
HEAD BLOCK PIN.
HANGER PIN.

JOURNAL BOX COVER HINGE PIN.

PINION. 1. The smaller cog wheel of two wheels in gear. See, SHIFTING PINION.

2. (Hand Car.) 4, FIGS. 4722-27. A small gear wheel attached to the axle of the car, into which the larger wheel on the crank shaft gears.

3. Pinion is sometimes incorrectly used in the sense of a small pivot pin or journal.

PINTLE. "A pivot pin, such as that of a hinge. The king bolt of a wagon."—Knight.

PINTSCH GAS BURNER. FIGS. 2519-25. Used on all Pintsch lamps other than the bracket lamps. It consists of a small lava tip of the "fish tail" type, held in a special brass pillar. Its consumption is about ⅝ cubic ft. per hour. A larger burner of the same type is usually employed on bracket lamps. Its consumption is about 1 cubic ft. per hour.

PINTSCH GAS LAMP. FIGS. 2568-2621. A lamp for burning gas, the essential features of which are the closed globe at the bottom, the white porcelain reflector above the flames near the top of the globe, and the peculiar method of supplying air.

Various forms of center lamps are made, all on the regenerative principle, the inlet air being highly heated before reaching the flames, thereby producing extreme whiteness and steadiness of light.

Some of these lamps are supported by four ornamental arms, FIGS. 2583-98, etc., one of which forms the gasway. In all, the interior of the lamp is so constructed that a portion of the light is reflected outward and upward toward the roof of the car, illuminating the same.

In all standard center lamps, FIG. 2606, air is admitted to the lamp immediately above the upper dome, 101. Passing thence through the orifices in chimney, 313, it comes in contact with the sheet iron flues, 312, and in its downward passage becomes highly heated. It then issues into the space within the dome, 101, between the dome and the mica chimney, 109, and continuing its course is by the diaphragm, 315, deflected and constrained to pass close to the mica chimney, where it is still further heated. It now passes outward between diaphragm, 315, and the ring reflector, 110, and through the orifices near the outer rim of this reflector into the bowl and to the flames. In its tortuous course the effect of drafts against the lamp is entirely nullified.

The products of combustion escape directly through the annular space between mica chimney, 109, and the cup reflector, 111. Thence by flues, 312, out through the crown at the top of the lamp, in the case of the four arm lamps, and through the flues, 333.

In vestibule lamps, two or four flame, FIG. 2607, air is admitted to the annular space between the parts of ventilating chimney, 324, through the shielded opening above the roof, immediately below the ventilator. Becoming heated in its downward passage, it passes through the diaphragm, 323, and through the orifices in the body, 320, to the flames. The products of combustion escape through the flues, 321, and the chimney, 324, to the outside air. Any excess of air over and above what is required for proper combustion of the gas will also be carried off by the ventilating chimney, which the air reaches from the space above the body by means of the passage around the outside of the chimney, 321.

Bracket lights, wall lamps for express cars and vestibule lamps, FIGS. 2658-70, are supplied in various designs and forms.

The burner is of the "fish tail" type, and from one to six are used in each lamp or light, four being the number generally adopted. See, PINTSCH BURNERS. Consumption of gas is at the rate of about ⅝ cubic ft. per hour for each burner enclosed in a lamp, or 1 cubic ft. per hour for single open burners.

PINTSCH GAS LAMPS. (Method of Securing and Connecting.) (Four Arm Lamps.) FIG. 2605. The arms are secured by means of nipples, 26, pasing through the roof; a water tight joint around the nipples on the roof being made by bedding putty close around the nipple, with a rubber washer, 24, above the putty, and the iron washer, 23, above the rubber. The lock nuts, 27, are then put on and forced down until the excess putty is forced out and the arm drawn firmly up to its place. The gas arm nipple is then supplied with the reducing ell, 28, the three blank arms with caps, 29. The ell, 28, is then connected with the ⅛-in. pipe to the flange tee, 16c, on the roof line. The roof around the smoke bell is protected with a tin thimble, large enough to give a ½-in. air space around the smoke bell flue. The upper end of this thimble is made of proper size to receive the ventilator, 204.

PINTSCH PILLAR. 230, FIG. 2516. Used on bracket lamps below the burner, 222, FIG. 2519. Where no globe holder is used, mill check, 231, FIG. 2514, is placed immediately below the pillar, 230.

PINTSCH SYSTEM OF GAS LIGHTING. FIGS. 2466-2621. A system of car lighting which burns gas taken from a storage tank, where it is carried under a pressure of 150 lbs., or less, per square inch. The system is well and favorably known. The gas is an oil gas, made from crude petroleum or similar oils, and is able to withstand a high degree of compression without undue loss of luminosity. The pressure of 150 lbs. of the receiver tank is automatically reduced by the Pintsch regulator (FIG. 2473) to a uniform pressure at the burners of about ½ oz., regardless of the pressure in the gas receiver. Works for the supply of the gas are now established in all the large cities.

The arrangement of the apparatus is shown in FIG. 2466. The receiver or gas holder, A, suspended beneath the car floor, is connected by a system of extra heavy ¼-in. pipes, with soldered joints and special fittings, to the regulator, R. The charging of the receiver is effected (from either side of the car) by means of hose, connecting the charging lines from the gas station with the filling valves, F (FIG. 2468). The gage, G, communicating with the high pressure pipes connecting the various parts of the apparatus below the car, serves the double purpose of registering the amount of pressure in the receiver at any time and of showing the amount of gas consumed in lighting the car for any given period.

From the regulator, R, the gas (with its pressure reduced to about ½ oz. per sq. in.) passes upward through the car toward the roof. At some convenient point, as in a saloon or locker, a main cock (No. 25c, FIG. 2475) is placed as shown, whereby the flow of gas to the lamps is controlled.

A ½-inch pipe is run along the roof, with ⅛-inch branches to each lamp or bracket. These branches are made by means of special flanged tees (No. 16c, FIG. 2478). Where ⅛-inch connections are necessary passing downward from the ½-inch low pressure line on the roof to brackets or vestibule lamps, the flanged elbow or angle fitting (No. 17A, FIG. 2482) is used.

For lamps and methods of suspending and connecting them see, PINTSCH GAS LAMPS and FIGS. 2568-2621.

PINTSCH WASHERS. FIGS. 2507-09, 2517-18, etc. These washers are of lead and rubber, in three sizes, and are always used in pairs. The rubber is always placed first on the fitting, the lead outside with the collar inward. When pressure is brought upon the washer, the lead collar protects the inner edge of the rubber, and the body of the lead washer protects the outside surface of the rubber, and the rib protects the outer edge of rubber. The rubber is entirely enclosed in metal,

and protected from the action of the gas, which would otherwise destroy it. The scored surfaces of the flanges entering into the soft lead make a perfectly tight joint. These washers are used on all classes of flanged fittings, whether high or low pressure.

PIPE. "A tube for conveyance of water, air, or other fluids." —Knight. The wrought iron pipes used for conveying gas, steam, etc., and commonly called gas pipe, are usually meant by compound words beginning with pipe, as below. See,

BRAKE CYLINDER PIPE.
BRAKE PIPE.
COLD AIR PIPE.
CONDUCTORS' VALVE DISCHARGE PIPE.
CONDUCTORS' VALVE PIPE.
DEFLECTOR PIPE.
DISCHARGE PIPE.
EXHAUST PIPE.
GUARD PIPE.
HOT AIR PIPE.
INJECTOR PIPE.
RUNNING PIPE.
SIGNAL PIPE.
SMOKE PIPE.
STEAM PIPE.
STOVE PIPE.
SUPPLY PIPE.
TRIPLE VALVE BRANCH PIPE.
WASTE PIPE.
WATER DRIP PIPE.
URINAL DRIP PIPE.
URINAL VENTILATING PIPE, ETC.

PIPE BUSHING. FIG. 2285. See, BUSHING.

PIPE CLAMP. FIGS. 598-99. A clamp for the air brake pipe or train pipe under the car.

PIPE CLIP, OR STRAP. FIGS. 2255, 2259. An iron band for fastening a pipe against or to some other object. They are usually single, but sometimes double, for two or more pipes. See, CLIP.

PIPE COUPLING. FIGS. 2271-72. A short cast iron tube with a thread cut on the inside at each end, which is screwed on the ends of two pipes and used for uniting them together, or uniting one pipe with another object, as a cock or valve. In some couplings the thread at one end is right hand and the other left hand, but generally they are both right hand threads. Also see, REDUCING PIPE COUPLING.

PIPE FITTINGS. FIGS. 2270-86, etc. The connections for systems of wrought iron gas, water, and steam pipes. The more usual pipe fittings are bushings, elbows, tees, return bends (close or open), reducers, couplings, nipples, plugs, clips, etc.

PIPE HANGER. FIGS. 600-1. A hanger for the air brake pipe or train pipe.

PIPE REDUCER. See above. Bushings, tees and couplings may be and are all so made as to serve as reducers.

PIPE SCREW THREADS. Screw threads used for connecting wrought iron pipes together. Such screws are cut "tapered"; that is, the end of the pipe, or the inside of the coupling where the thread is cut, forms part of a cone, so that in screwing up the pipe a tight joint can be made. Pipe threads are of a V-shape, sharp at the top and bottom, and their sides stand at an angle of 60° to each other. The following is the number of threads per inch for pipes of different sizes. The size is given by the inside diameter, but the actual bore of the smaller sizes is considerably larger than the nominal. The exterior diameter of ordinary gas pipe is from .27 to .37 inches greater than the inside diameter.

AMERICAN STANDARD SYSTEM OF PIPE THREADS.

Size of pipe.	Outside diameter. Ins.	Inside diameter. Ins.	Inside diam. Extra strong. Ins.	Inside diam. Double extra strong. Ins.	Threads per inch.	Whitworth's thread.
⅛ in.	.405	.27	.205		27	28
¼ "	.54	.364	.294		18	19
⅜ "	.675	.494	.421		18	19
½ "	.84	.623	.542	.244	14	14
¾ "	1.05	.824	.736	.422	14	14
1 "	1.315	1.048	.915	.587	11½	11
1¼ "	1.66	1.38	1.272	.884	11½	11
1½ "	1.9	1.611	1.494	1.088	11½	11
2 "	2.375	2.067	1.933	1.491	11½	11
2½ "	2.875	2.468	2.315	1.755	8	
3 "	3.5	3.067	2.892	2.284	8	
3½ "	4.	3.548	3.358	2.716	8	
4 "	4.5	4.026	3.818	3.136	8	
4½ "	5.	4.508			8	
5 "	5.563	5.045			8	
6 "	6.625	6.065			8	
7 "	7.625	7.023			8	
8 "	8.625	7.982			8	
9 "	9.688	9.001			8	
10 "	10.075	10.019			8	

(The European standard is the Whitworth pipe thread, which is quite different.)

Taper of Thread ¾ in. per foot.

PIPE SUPPORT (Baker Heater). FIG. 2268. A cast iron stand screwed to the floor, with a receptacle at the top to receive and hold a pipe.

PIPE TURNBUCKLE. See, TURNBUCKLE.

PIPING (Baker's Plan). For heating passenger cars. FIG. 2287.

PISTON. A metal disk with packing, etc., made to fit air tight and work back and forth in a cylinder. Those shown in this volume are chiefly in connection with air brakes, FIGS. 893-94, etc., to which more detailed reference seems unnecessary. The piston consists of a piston head, attached to a piston rod. The piston follower or follower plate lies at the back of the piston head, inclosing between them the piston packing rings, or (in the Westinghouse air brake cylinders) the piston packing leather, which latter is provided with a packing leather expander. The follower plate is secured to the piston with follower bolts. All these parts are essentially the same in all the various cylinders shown, and for distinctness should be designated with the name of the cylinder within which they work.

PISTON PACKING EXPANDER (Air Brake). 8, FIGS. 918-19, 975-77. See below.

PISTON PACKING LEATHER (Air Brake). 7, FIGS. 918-19, 975-77. A circular ring of leather used as a substitute for PISTON PACKING RINGS, which see, pressed into the cylinder so as to have an L-section, which is attached to and surrounds the piston and bears against the inside surface of the cylinder, being pressed against it by a round steel rod called the piston packing expander.

PISTON PACKING RING. 67, FIGS. 893-94. A circular metal ring of rectangular section which is placed in grooves in the edge of a piston head to make it work air tight in its cylinder. The rings are turned slightly larger than the cylinder and cut in two diagonally at one point, so that when compressed they will tend to spring open.

PISTON RING (Engineer's Valve). 19, FIGS. 907-09; 3, FIGS. 968-71. (Triple Valve.) 3, FIG. 966.

PISTON ROD (Air Pump). 18, FIG. 965.

PISTON ROD CROSS HEAD (Brake Cylinder). 17, FIG. 975.

PISTON ROD NUT (Air Pump). 74, FIG. 965; 68, FIGS. 893-94. A screw nut on the lower end of the piston rod, which holds the piston on the rod.

PISTON ROD PACKING GLAND (Air Pump). 96, FIGS. 893-94 and 38, FIG. 965. A metal ring which encircles the piston rod, and which is forced into the stuffing box and against the packing, which is then compressed by the packing nut, 97. More commonly called a stuffing box gland.

PISTON ROD PACKING NUT. 1. (Air Pump). 97, FIGS. 893-94 and 36, FIG. 965. See above. Called stuffing box nut.

2. A nut which is used for holding the piston rod cup leather in its place, which thus makes an air tight joint in which the piston rod works.

PISTON STEM (Buhoup Vestibule). 54, FIGS. 1526-1630.

PISTON STEM AND NUT (Reducing Valve). 6 and 7, FIGS. 952-53.

PISTON STEM BRACKET (Buhoup Vestibule). 119, FIGS. 1526-1630.

PISTON STEM FERRULE (Buhoup Vestibule). 122, FIGS. 1526-1630.

PISTON STEM GUIDE (Buhoup Vestibule). 120, FIGS. 1526-1630.

PISTON STEM SPRING (Buhoup Vestibule). 47, FIGS. 1526-1630.

PISTON STEM WASHER (Buhoup Vestibule). 57, FIGS. 1526-1630.

PISTON STUFFING BOX (Air Pump). 95, FIGS. 893-94.

PISTON TRAVEL INDICATOR. A graduated scale abutting against the piston of a brake cylinder and passing through the end of the cylinder so that it can be seen. It shows the maximum movement of the piston since it was last adjusted. Seldom used.

PISTON VALVE (Engineer's Valve). 18, FIGS. 907-09.

PIT. See, ASH PIT.

PITCH. 1. (Of a screw.) The advance made by the thread in one complete revolution, usually expressed by the number of threads in a given space, as (in U. S. and England) an inch.

(Of a Roof.) The ratio of the rise of a roof to the horizontal distance covered.

PITCHING ROOF. A roof formed of one or more inclined plane surfaces. When the pitch becomes steep, the term is used to distinguish a roof formed of plane surfaces from one formed of curved or arched surfaces.

PIVOT. 1. "A pin or short shaft on which anything turns." —Webster. Seat arm pivots are inaccurately called rivets. See,

DECK SASH PIVOT.
LOWER SWING HANGER PIVOT.
MONITOR DECK SASH PIVOT.
RATCHET PIVOT.
ROCKER PIVOT.
SEAT ARM PIVOT.
UPPER BERTH REST PIVOT.
VENTILATOR PIVOT.
UPPER SWING HANGER PIVOT.

2. (Of Car Door Fastener.) The pin on which the hasp turns.

3. (Monitor Deck Sash Pivot.) The pin held in place by a spring upon which the deck sash turns.

PIVOT BEARING. 49, FIGS. 3781-3951. See, SWING HANGER PIVOT BEARING (Passenger Car Trucks).

PIVOT PLATE. See, SEAT ARM PIVOT PLATE. WINDOW PIVOT PLATE. VENTILATOR PIVOT PLATE.

PIVOT SPRING (Monitor Deck Sash Pivot). The spring retaining the pivot in its proper place after the sash has been placed in position.

PIVOTED SEAT OR SEAT CUSHION. A seat commonly called an "opera seat," with the cushion pivoted so that it may be raised to permit easy access. Used in dining cars.

PIVOTED SEAT BACK ARM. FIGS. 3343.

PLAIN TRIPLE VALVE (Air Brake). FIGS. 913, 966. A triple valve which has no provision for making emergency applications. See, TRIPLE VALVE.

PLANISHED IRON. One of the attempted substitutes for Russia iron. One of many processes consists of the formation of an oxidized surface on each sheet over and above the surface secured in ordinary working. The oxidized surface is then reconverted into metallic iron, which will enter readily into combination with an oxidizing agent applied throughout. The surface thus given to the sheet is fixed by planishing or hammering until the desired polish is secured.

PLANK. "A broad piece of sawed timber, differing from a board only in being thicker. In America, broad pieces of sawed timber, which are not more than an inch or an inch and a quarter thick are called boards; like pieces from an inch and a half to three or four inches thick are called planks."—Webster. See, SPRING PLANK. TRUSS PLANK.

PLANK CAR ROOF. More commonly SINGLE BOARD ROOF, which see. See also CAR ROOF.

PLANTED MOLDING, OR BEAD MOLDING (English). American equivalent, panel strip molding, or bead molding. In a carriage, a small molding which is pinned on the body, and is not worked out of the solid on the post or rail, as is a WROUGHT MOLDING, which see.

PLASTERED LAMP. A lamp with a fixed globe which is fastened to a lamp frame with plaster of Paris.

PLATE. 1. (Architecture.) "A piece of timber which supports the ends of the rafters."—Webster.

2. (Car Building.) 46, FIGS. 159-69, 185-95; 98, FIGS. 360-72, 385-87, 388-91. A horizontal piece of timber on top of the posts of a car body supporting the roof carlines or rafters. Also sometimes called side plate, in distinction from an END PLATE, which see, which is a similar stick across the end of the car. A deck plate is used to cap the deck posts of an upper deck. MAIN CARLINES, which see, are sometimes called tie plates. In refrigerator cars BOGUS PLATES (which see) are used.

PLATE. (Of a Cast Car Wheel.) The central portion connecting the hub and tread, sometimes single plate, sometimes double plate. The plate is stiffened by brackets. See CAR WHEEL and FACE PLATE (Steel Tired Wheel).

PLATE, OR LAMINATED BUFFING AND DRAW SPRING (English). A large half elliptic spring which spans the distance between the two buffer rods and takes the buffing strains. It is also connected in the center to the drawbar and takes the draft strain.

PLATE FACING. An inside cornice fascia board.

PLATE ROD (Freight Cars). 47, FIGS. 159-69. A horizontal metal rod which passes through two plates to tie them together.

PLATE SIDE FRAME TRUCK. Fig. 3734. A truck for passenger cars with a plate side frame made of steel and reinforced with angles. The journal boxes are fitted in jaws or pedestals cut out of the plate, as are also the equalizer and bolster springs.

PLATE WASHER. Usually a wrought iron cut washer, in distinction from a cast washer, but also used to designate many forms of large washers or plates serving as double or triple washers. See WASHER.

PLATE WHEEL. FIGS. 4156, 4159, etc. A car wheel of which the center portion is formed of a disk or plate instead of spokes. Varieties are the single, double, open and combination plate wheel. See, WHEEL and CAR WHEEL.

PLATFORM (Passenger and Caboose Cars). 1. 31, FIGS. 343-48; 34, FIGS. 360-72, and vestibules, FIGS. 1526-1711. A floor at the end of a car, supported by projecting timbers below the car body to facilitate ingress and egress. On freight cars they are not common, except on ca booses, but narrow platforms are sometimes added for convenience of train men. See also GOULD, JANNEY and STANDARD PLATFORMS, containing certain special modifications of the platform, which have greatly added to its strength and security.

2. (Pile Driver Car.) See SWINGING PLATFORM.

PLATFORM CAR. FIGS. 15-20 and 223-38. A flat car, which, if provided with sides, becomes a gondola car.

PLATFORM CHAIN. A chain connecting the inner platform railings, posts and rails, closing the passageway between the platforms of two cars coupled together. It is used only on rear end of last car, and front end of first car when the first car is a passenger car.

PLATFORM END HAND RAILS, PANELS AND BRACKETS. Figs. 3033-35.

PLATFORM END POST, OR CORNER POST. A hollow iron post standing upon the platform end sill and helping to support the platform hood.

PLATFORM END SILL. 38, FIGS. 360-72, 388-91.

PLATFORM END TIMBER, OR BUFFER BEAM. 38, FIGS. 360-72, 388-91. A cross timber at the outer end of a car platform. A platform end sill.

PLATFORM FLOOR. 34, FIGS. 360-72.

PLATFORM FOOT PLATE. See FOOT PLATE.

PLATFORM FURNISHINGS. FIGS. 3017-39.

PLATFORM GATE. FIGS. 3040-41, 3053-62. A gate used to close the entrance to a platform, in general use only for private cars, suburban cars or street cars.

PLATFORM GATE PANEL. FIG. 3024.

PLATFORM HOOD. 107, FIGS. 360-72 and 20, FIGS. 1784-86. A cover or canopy attached to the end of a car body, covering the platform. They are made of either wood or sheet iron. When it consists of an extension of the main roof of a car it is called a platform roof; but when it is a separate part, and fastened to the car body, as is usually the case on street cars, it is called a platform hood. A roof apron is a vertical finish of sheet iron to either a platform hood or platform roof.

PLATFORM HOOD BOW. 108, FIGS. 385-87. A bent wooden or iron bow which forms the outer edge of a platform hood, to which the platform hood carlines are fastened.

PLATFORM HOOD BRACKET. A bracket or knee iron to connect the hood to the corner post.

PLATFORM HOOD CARLINES. Transverse timbers which support the roof of a wooden platform hood.

PLATFORM HOOD CEILING. See PLATFORM HOOD SIDE PIECE.

PLATFORM HOOD KNEE. An L-shaped piece of wrought iron by which a platform hood is fastened to the car body.

PLATFORM HOOD MOLDING (Street Cars). A small wooden molding to cover the nails with which the roofing canvas is fastened around the edge. It corresponds with a roof molding.

PLATFORM HOOD POST. 109, FIGS. 388-91. An upright iron bar or rod attached either to the platform or platform railing, to support a platform hood.

PLATFORM HOOD SHOULDER CARLINE. A hood carline that lies adjacent to and against the end plate in a street car.

PLATFORM HOOD SIDE PIECE. The end piece to which the ceiling is attached.

PLATFORM KNEE, OR PLATFORM TIMBER (Street Cars). A longitudinal piece bolted to the underframe and extending out under the platform to support it. Corresponds to the platform sill of a coach.

PLATFORM LEVER (Janney Platform). A lever corresponding to the Miller uncoupling lever, actuating the pull rod which operates the catch lever.

PLATFORM LEVER PIN (Janney Platform). The pin on which the platform lever pivots.

PLATFORM PLATE, OR BUFFER. A steel angle plate bolted to the buffer stems and overlapping the platform end sill. When in contact with the like plate of another car, it makes a continuous floor between them. Being pivoted at the platform end sill, it adjusts itself to all curves of the road. The platform plate also acts as a buffer, and is sometimes so called. See VESTIBULE.

PLATFORM POST. 39, FIGS. 388-91. See below.

PLATFORM RAIL. 41, FIGS. 388-91. A wrought iron bar fastened to the tops of the platform posts, forming a railing on the end of a car platform. On steam cars an opening is left in the middle of the railing to allow persons to pass from one car to another. The railing is therefore made in two parts, and two platform rails are used. On street cars no such passageway is left, and the rail is in one piece. The outside ends of the platform rails of steam cars are usually carried down to the end timber, so as to form the outside post. On street cars the outside end is attached to an ordinary post.

PLATFORM RAILING. FIGS. 3017, etc. An inclosure consisting of iron posts and rails on the end of a platform of a car to prevent persons from falling off. See above.

PLATFORM RAILING CHAIN. A chain connecting the two sections of the platform rails of a passenger car. Commonly used in service on the rear platform of the rear car only.

PLATFORM RAILING POST. 39, FIGS. 388-91.

PLATFORM ROOF. 103, FIGS. 360-72. That portion of a car roof which projects over the platform. See PLATFORM HOOD.

PLATFORM ROOF CARLINE. 104, FIGS. 360-72, 388-91. See CARLINE.

PLATFORM ROOF END CARLINE. 105, FIGS. 360-72, 388-91. See CARLINE.

PLATFORM SAFETY GATE. A gate to close the entrance on one side of a street car, to prevent passengers from getting on or off on the side of the double track. See also PLATFORM GATE.

PLATFORM SHORT SILLS. 37, FIGS. 360-72, 388-91. Short longitudinal pieces of timber, not extending under the car proper, which are framed into and bolted to the end sills and platform end timbers of a passenger or street car to sustain the floor of the platform. The longer timbers which extend under the body of the car proper are called platform sills.

PLATFORM SILLS. 35, FIGS. 360-72, 388-91. Pieces of timber attached to the bottom of a car frame at each end outside of the draw timber, and projecting beyond the end of the car to support the platform. They extend usually from the platform end timbers to the bolster, or, in street cars, to one of the transverse floor timbers. See above.

PLATFORM STEPS. 30, FIGS. 343-52; 45, FIGS. 360-72, 388-91. The stairs at each corner of a passenger or street car which afford the means of ingress and egress. Forms of steps have been introduced, but are not in general use, which are folding or extensible, being dropped down into position when the car is stationary, and removed or elevated when the train starts. In modern passenger cars the platform steps consist of usually three and sometimes four separate steps below the platform. The steps being of wood, are often called box steps. On street cars, one step only is used, and it is commonly made of plate iron. See VESTIBULED PLATFORMS.

PLATFORM SUB-SILL (Street Cars). A sub-end sill, to which the platform is hung; it makes part of the riser of the step from the platform into the car.

PLATFORM TIE RODS. Horizontal rods which pass through the platform end timber and end sill or body bolster, for the purpose of holding them and the other portions of the frame of the car securely together.

PLATFORM TIMBER. See PLATFORM SILL.

PLATFORM TIMBER BAND (Street Cars). A band made of plate iron, which covers and embraces the outer end of a platform end timber. Called also a buffer band.

PLATFORM TIMBER, OR PLATFORM SILL, CLAMP. A U-shaped iron clamp or bolt, with which a platform sill is fastened to the end sill of a street car.

PLATFORM TRAP DOOR. 1. FIGS. 1795-98. A door which covers the space occupied by the steps, and thus extends the platform out to the side of the car. It is used on officers' or other private cars, and invariably with the Pullman extended vestibule.

2. A door used in cabooses to serve the purpose of a water closet.

PLAY. See END PLAY. LATERAL MOTION.

PLAYER TRUCK. FIGS. 3741-44. A form of diamond arch bar truck having a cast steel bolster and cast steel transoms.

PLOW. See SNOW PLOW.

PLUG (Pipe Fittings). FIG. 2264. A short, solid, metal cylinder, with a screw on the outside and a square or hexagonal end to take hold of with a wrench, screwed into the end of a pipe or hole in a plate, to close the opening. See also, BASIN PLUG.

PLUMBAGO. Graphite; one of the forms of pure carbon from which pencils, etc., are manufactured. When pulverized, plumbago is an excellent lubricant, especially under heavy loads, and plumbago oils, prepared so as

to hold the plumbago in permanent suspension, are among the most efficient of all lubricants.

PLUSH. "A species of shaggy cloth or stuff with a velvet nap on one side, composed regularly of a woof, of a single thread and a double warp; the one, wool of two threads twisted, the other of goat's or camel's hair. But some plushes are made wholly of worsted, others wholly of hair."—Webster. Plush is used in car building chiefly as a covering for upholstered seats, for which it is almost invariably used.

PNEUMATIC TOOLS. FIGS. 4956-69.

POCKET. 1. (Sleeping Cars.) 32, FIGS. 1778-80. A receptacle for the clothing and small baggage of occupants of sleeping berths. They are known as the head board pocket for the lower berth and upper berth pocket. It is formed by turning the head rest up, as shown in FIG. 1778.

2. Any object having a cavity or opening which forms a receptacle to hold anything in its place. The main pockets of a car are the body post, corner post and right and left hand body brace pockets, which are castings fastened to the upper side of the sill and the under side of the plate, to serve instead of mortises to receive the posts and braces. Brace pockets are distinguished as right or left hand, according to the inclination of their top to a person standing facing the car. Double brace pockets, to receive two braces inclining in opposite directions, are also made, often with a receptacle in the middle for a post. A post pocket is a receptacle for the posts, door post or corner post. A stake pocket of a flat or gondola car should be distinguished from a post pocket, it being bolted to the outside on the side of the side sill. See also, DRAWBAR SPRING POCKET.

POCKET HINGE. FIG. 1963. See HINGE.

POCKET STRAP OR YOKE (Drawbar Attachment). The U-shaped strap or yoke that incloses the draft spring and follower plates. See, YOKE.

POLE OR HAND STRAPS. FIGS. 2907-10. Straps to which people who are required to stand may cling and keep from falling as the car starts and stops. See, HAND POLE.

POLE OR HAND STRAP BRACKETS. FIGS. 2890-93. For street cars from which the straps are suspended. See above.

POLING CAR. See PUSH POLE CAR.

POP SAFETY VALVE. A valve set with a spring so as to open suddenly with a wide opening at a fixed pressure; hence the name.

PORT. An opening in a valve for the passage of steam. See STEAM PORT.

POST (of a Truss). A piece of timber or metal set upright and intended to support something else, as the posts of a house; the posts of a door; the posts of a gate; the posts of a fence; the posts of a bridge. See

BODY POST.	LEVER FRAME POST.
BODY QUEEN POST.	PLATFORM HOOD POST.
BRAKE BEAM KING POST.	PLATFORM POST.
CORNER POST.	QUEEN POST.
DECK POST.	TRUCK BOLSTER KING POST.
DOOR POST.	TRUCK FRAME KING POST.
HAND RAIL POST.	TRUCK FRAME QUEEN POST.
HAT POST.	WINDOW POST.

POST BRACKET (Open Street Car). The cast brackets between the posts and plate on the side.

POST CROSS BAR (Open Street Car). A bar or plank connecting the posts at the ends of a transverse seat. They are under the seat.

POST OFFICE CAR. See POSTAL CAR.

POST PARTING STRIP. See SASH PARTING STRIP.

POST PLATE. (Buhoup Vestibule.) 12, FIGS. 1526-1630.

POST POCKET. FIGS. 463-5. An iron casting which is attached to the top of the sill of a car to receive and hold a post in distinction from a stake pocket which is bolted to the outside of side sill. Such pockets are more commonly used with stock cars. See POCKET.

POSTAL CAR. FIGS. 112-119, 378-79. A car for carrying mail matter, and fitted up with boxes and other conveniences for assorting and distributing it. Nearly all mail matter is now assorted en route.

A distinction has been attempted between mail cars, used solely for carrying mails and distributing postal cars, but the distinction is not well observed, and so-called mail cars, except as compartments in combination baggage cars on minor lines, are little used. The word mail is invariably used in speaking of a combination baggage and mail car.

The railway post office is an English invention, separate postal cars having been used as early as 1837. The present American postal car service was introduced by George B. Armstrong in 1864, and the first postal cars were run between Chicago and Clinton, Ia., and at about the same time between Washington and New York. Postal cars are owned by the railway companies, but when in use are under the exclusive control of the post office authorities. They are usually built after plans and specifications approved by the Superintendent of Railway Mail Service, in whose district they are to run.

POSTAL CAR CHANDELIER. FIG. 2584. See, CHANDELIER. A variety of postal car lamps and chandeliers have been introduced with the object of giving a brilliant light when and as desired. Pintsch gas lamps and oil lamps with the Acme burner are in special favor.

POSTAL CAR FURNISHINGS. FIGS. 3063-88.

POSTAL CAR SIDE LAMP. FIGS. 2700-01. See, POSTAL CAR CHANDELIER.

POSTAL LAMP. See POSTAL CAR CHANDELIER.

POT. See FIRE POT.

POUCH HOOK (Postal Cars). FIGS. 3067, 3080-85. Hooks used for suspending mail bags while assorting the mails. They are usually strung loosely upon a rod, and are distinguished as square eye or round eye, according to the section of the rod. Some forms are permanently attached to the side of the car.

POUCH RACK. A rack built of standards and horizontal rods to which the pouch hooks are attached and which support the pouches or bags while mail is being distributed into them.

POULTRY CAR. A car specially designed to carry live poultry. The car is provided with arrangements for feeding, watering, and by removing intermediate floors may be arranged to carry geese and turkeys instead of chickens.

PRATT DUMP CAR. FIGS. 30, 318-21. A side dump car for carrying coal. The side planks are hinged on a shaft running the length of the car, and so arranged that the lower plank may be raised and the upper swung down, opening the whole side of the car.

PRESS. See SEAL PRESS.

PRESSURE BAR. (Gould Buffing Apparatus.) A stiff iron bar of a cross shaped (+) cross section, which connects the drawbar to the buffer spring, so that the draft spring reinforces the buffing spring and the buffing spring takes up part of the pull on the drawbar, thus relieving the draft spring. The pressure bar also forces out the buffer stem and plate when the drawbar is pulled out, thus maintaining a continuous platform between the cars.

PRESSURE GAGE (Pintsch Gas Lighting). FIG. 2470. A gage usually placed in the saloon. It registers atmospheres and not pounds, for convenience in computing the volume of gas in the tank.

PRESSURE REGULATOR (Gold's Car Heating). FIG. 2345. A valve designed to regulate the delivery pressure of steam, etc. It depends entirely upon the elasticity of springs, the pressure of which can be gaged or regulated by screw studs that bear upon one end of the

springs. In the Gold pressure regulator there is a spring on each side of the valve.

PRESSURE REGULATOR (Pintsch Gas Lighting Apparatus). R, FIG. 2466, and FIG. 2473. The valve by which the pressure of the compressed gas is reduced for consumption. The pressure regulator is one complete fixture, adjusted by the maker. Names of the principal interior parts are diaphragm, diaphragm connecting rod, diaphragm lever, regulating valve and dust arrester.

PRESSURE RETAINING VALVE (Westinghouse Brake). FIGS. 911-15. A valve for use on long and steep gradients, provided with a valve connected with the discharge port of the triple valve. It is controlled by a small handle, which, if turned in one direction, permits the air to escape freely, and, if in the other, forces it to pass through the valve. In descending long gradients the valve retains a pressure of 15 lbs., which keeps the train under control when the brakes are released to recharge the reservoirs. On slight grades or on a level the cock is turned to permit the air to escape freely without raising the valve. This valve does away with the necessity of using straight air on such grades.

PRIMING (Painting). The first coat in car painting. Usually a pure thin oil put on hot, at about 150° F. or less. A thin DRIER, which see, of red lead or borate of manganese, is used with it. The next coat is the scraping filling coat or ROUGH STUFF, which see. See also PAINTING.

PRIVATE CAR. FIGS. 92-94, 121-22, 124. Either an OFFICERS' CAR or EXCURSION CAR, which see.

PRIVATE LOCK (English). A door lock universal in passenger service, which can only be operated by a tapered rectangular hardened steel key, which is carried by all passenger trainmen, and most habitual travellers. One key will open any private lock.

PRODUCE CAR. FIGS. 6, 193-95. A modified form of refrigerator car, provided with ventilators and ice boxes, for the transportation of fruit, vegetables and perishable produce.

PROFILE CARLINE. A CARLINE, which see, extending from one plate to the other, bent to conform to the shape of the clear story. They are, of necessity, always COMPOUND CARLINES, which see.

PROPELLING CHAIN (Steam Shovel). 28, FIGS. 357-59.

PROPELLING GEAR (Steam Shovel). 27, FIGS. 357-59.

PROPELLING LEVER, OR HAND CAR LEVER (Lever Hand Car). 19, FIGS. 4722-27. The main lever, to which power is applied.

PROPELLING LEVER BRACE RODS (Lever Hand Car). 25, FIGS. 4722-27.

PROTECTION CAP. A lamp jack.

"PROTECTION" CUSPIDOR. FIGS. 2178-79. One with a large mat fastened to it to prevent overturning. See, CUSPIDOR.

PROTECTION OF TRAINMEN (M. C. B. Standards). FIGS. 4444-67, 4479-80. In 1893 a Recommended Practice was adopted to protect trainmen from accident, under the sub-heads as given. In 1896 some changes were made, especially in regard to hand holds, and by the elimination of various details from drawing. In 1902 it was changed to Standard.

Position of Brake Shafts.—The brake shaft to be placed on what is the left hand corner of the car when a person is standing on the track facing the end of the car. The ratchet wheel and brake pawl to be fastened to a suitable casting attached to the roof. The center of the brake shaft to be 20 inches from the middle of the car. See Proceedings 1888, pages 25 and 123; Proceedings 1893 and 1896.

Running Boards.—The ends of the running boards of box cars to be made to project over the ends of the cars, and properly supported, so that the end of running board shall not be more than 6 inches back of face of buffer block. The running board shall be made not less than 18 inches wide. See Proceedings 1888, pages 24 and 123; Proceedings 1893 and 1896.

Steps.—Two good substantial steps, to be made of wrought iron, about ½ by 1½ inches section, to be fastened, one to each side sill, next to the corner of the car to which the ladder is attached on cars having ladders, and to diagonally opposite corners on all other cars. The steps to be not less than 12 inches long, measured horizontally between the sides, and the tread to be not less than 8 inches below the bottom of the sill. The side of the step next to the corner of the car to be as near to the end of the car as is practicable. Each side of the step to be fastened to the sill with two ½ inch bolts and nuts. See Proceedings 1888, pages 25 and 121; Proceedings 1893; Proceedings 1902.

Ladders.—Each box and stock car should have two iron or wooden ladders, with not less than five steps to each ladder; steps, if of iron, to be not less than ⅝ inch diameter; if of wood, to be not less than 1½ by 2 inches, and to be made of hardwood; the steps to be not less than 2½ inches from side or end of car; each ladder to have the hand hold on the roof directly over top of ladder, the hand hold to run longitudinally with the car, and to be located about four inches from the side edge of the roof. When iron ladders are used and placed on ends of car, the bottom step to have a guard or projection to prevent men from slipping when swinging around the end of car to get on the step. Proceedings 1902. See, HAND HOLD.

PULL. "A catch or lip upon a drawer, door or window, by which it is pulled open."—Knight. See

DOOR PULL. SEAT PULL.
DRAWER PULL. SLIDING DOOR PULL.
DECK SASH PULL. WINDOW BLIND PULL.

PULL HOOK OR DECK SASH OPENER. FIGS. 3516-22. A shaft with a small hook on the top for opening deck sashes. Also called ventilator staff.

PULL IRON. 58, FIGS. 159-69. A roping staple. A U-bolt passing through the side sill for the purpose of attaching ropes in switching. A push pole corner iron, 191, is a lower corner plate with a socket cast or forged thereon, and in which the end of a pole is inserted for pushing instead of pulling the car.

PULL RING. FIGS. 3516-22. A metal ring with a screw attached, by which it is fastened to any object, as a sash, drawer, etc., to take hold of in opening it. Chiefly used for deck sashes.

PULL ROD (Janney Platform). 1. The rod connecting the uncoupling lever with the catch lever; also called an uncoupling rod.

2. (English Brake Gear.) Any rod transmitting tension when the brake is applied.

PULL ROD CARRY IRON. A carry iron for an uncoupling rod.

PULL ROD PLATE (Janney Platform). A small chafing plate on the Janney platform knee timber through which the pull rod passes. A pull rod carry iron.

PULLEY. "A wheel with a grooved, flat or slightly convex rim, adapted to receive a cord or band which runs over it. Its function is to transmit power or change the direction of motion."—Knight. A sheave is a pulley wheel in a block, but sheave and pulley are used as almost synonymous terms. See SHEAVE. See also

BELL CORD PULLEY. SIDE PULLEY.
BERTH CHAIN PULLEY. WINDOW CURTAIN PULLEY.

PULLMAN CAR. A name strictly applicable only to cars operated by the Pullman Company, but in common usage not unfrequently applied to "palace" sleeping, parlor or drawing room car built after the same designs as those adopted by Pullman Company, the Pullman cars having been the first of this class introduced on a large scale and in modern style of finish, and being much more in use than any other class of parlor or palace cars. Included among Pullman cars are sleep-

ing cars, parlor or drawing room cars, dining cars and combination cars. Late designs differ from the earlier designs in the use of a "buffet," etc., and in being finished in much lighter colored woods than the former dark styles prevalent.

The plans of Pullman cars are shown in FIGS. 121-22, etc. Interiors, FIGS. 83-103, etc. Framing, FIGS. 380-87. Sleeping car berth, FIGS. 1778-80. Vestibules, FIGS 1784-86. Truck, FIGS. 3781-3951.

PULLMAN PASSENGER CAR TRUCKS. FIGS. 3781-4056. Nearly, if not all, Pullman cars are equipped with six wheeled trucks, similar to the illustration, which is the latest standard at this writing, 1903.

PULLMAN SYSTEM OF WATER SUPPLY. FIGS. 2807-19. This system of water supply under air pressure replaces the old method of using pumps for raising water for wash purposes in sleeping cars. The system consists of forcing water into the wash bowls by air pressure taken from the brake system as applied to cars. When the auxiliary air brake reservoir is filled with air to a pressure of 60 lbs., an air governor, Q, admits air through a drip cup into an air tank, 36 inches long by 22 inches in diameter. This is a storage tank for use when cars are disconnected from the locomotive. The pressure carried is about 75 lbs. From this tank the air passes through a reducing valve, R (set for 22 lbs. pressure), into the water tank. At the end and centre of the tank is a special three way valve, P. This valve performs the triple service of admitting water and air, and also allowing the air to escape when the tank is filled with water. The valve, P, is operated from inside the car by a stem, marked W, to which is attached a pinion and gear. The air before passing into the water tank passes through a check valve, which is to prevent the water in the tank from backing into the air pipes; the water being forced out of the tank passes through a strainer or screen, T. This strainer is cleaned by the valve, Z, which when opened allows water to pass over the screen in such a manner as to thoroughly wash it. After passing through valve O the water enters the car and is led by pipes to the different washstands and closets. One pipe passes to the heater and the water goes through a check valve, I, and a shut off valve, H, when it enters the copper coil which encircles the fire magazine. The hot water passes by gravity to a tank marked N, which has a connecting pipe back to the coil. Through these pipes there is a constant circulation from the heater, which keeps the water hot. A connection is made from the top of this tank to the various washstands and bath tub where hot water is required. At each end of the car a fire hose is placed, which can be used at a moment's notice, under the tank pressure. At the top of tank N is a safety valve marked M. The water tank is insulated to prevent the water freezing in cold weather. This insulating box contains about 20 ft. of heater pipe, which is connected with the heating pipes of the car.

PULLMAN WIDE VESTIBULE. FIGS. 1784-86. A vestibule which incloses and utilizes the whole of the platform of a car. It is provided with equalizing devices above and below and employs the same frictional resistance to prevent lateral oscillation as the earlier type. The improvements are chiefly confined to the platform inclosure. Windows are introduced at the end of the car in this construction, which permit of better ventilation. The platform may be utilized, the steps being covered with trap doors, so that the entire area of the platform is available. A single door may be used at the sides and avoid the double folding doors of the other pattern.

The peculiarities of the Pullman vestibule are explained under VESTIBULES, which see. The frictional resistance of the diaphragm face plates to oscillation under opposing spring pressure is accomplished by an ingenious mechanism, shown in the figures. The plate equalizer is intended to keep the upper part of the face plate thrust out and adjusted to its companion plate. It is shown in the hood and plan and the parts are numbered from 23 to 29 inclusive. The two sides are equalized at the top by the face plate equalizing lever, 27, and at the bottom by a platform equalizer.

PUMP. 1. (Air Brake.) FIGS. 893-94, 965. An AIR PUMP, which see.

2. (Wash Rooms) A BASIN PUMP, which see.

PUMP DRAIN COCK (Air Pump). 54, FIG. 965.

PUMP GOVERNOR (Air Brake). FIGS. 947-50, 963-64. An attachment designed to automatically cut off the supply of steam to the pump when the air pressure in the main reservoir exceeds a certain limit, usually about 90 lbs. The governor not only prevents the carrying of excessive air pressure, but also causes the accumulation of a supply of air in the main reservoir while the brakes are applied, which insures the release of the brakes, without delay. It also obviates the unnecessary working of the pump when the desired air pressure has been obtained.

PUMP GOVERNOR PISTON, NUT AND SPRING. 28, 29, 30, 31, FIGS. 947-50.

PUMP GOVERNOR UNION (Air Pump). 56 and 57, FIG. 965.

PURLIN. 83, FIGS. 159-69, etc. A longitudinal piece of timber over the rafters, extending from one end of the car roof to the other, to which the roof boards are fastened. Sometimes called a roof strip, but the latter more correctly applies to strips sometimes used above the purlins.

PUSH BAGGAGE CAR. A light lorry car, used at stations for moving baggage or freight from one train to another.

PUSH BAR (Gould Vestibule). A PRESSURE BAR, which see.

PUSH BAR (Westinghouse Brake). Usually called push rod. A compression bar which butts up against the piston of a brake cylinder, being guided by a hollow piston rod in such manner as to transmit the pressure of the piston when the air brake is used, but to simply move away from the piston, without moving the latter, when brakes are applied by hand.

PUSH BLOCK. See PUSH POLE CORNER PLATE.

PUSH CAR, OR LORRY CAR. FIGS. 4717, 4729-30. A four wheeled car, also called larry car, used to carry materials and tools, moved or pushed by hand. Also see, FERRY PUSH CAR.

PUSH POLE. A pole or wrought iron tube which is used as a strut to span diagonally the distance between the corners of a locomotive and a car, standing on two parallel tracks, and which is used to push such car without switching the locomotive onto the same track that the car occupies.

PUSH POLE CAR. A flat car with a push pole attached to the side sill so that it can be used in "poling" cars. The pole of former days has become a wrought iron tube, and one end is pivoted to the side sill of the car. A post and lever is attached to the pivoted end so it can be swung out over the side track by the operator, who stands upon the push pole car. See, PUSH POLE.

PUSH POLE CORNER PLATE OR IRON. 191, FIGS. 159-69, 271-95. A plate for inserting poles or bars in switching to enable the car to be moved from the side by an engine on a parallel track. It is usually a cavity cast upon the lower corner plate, and not a separate attachment. A ROPING STAPLE, which see, serves the same purpose for the use of a rope.

PUSH ROD (Westinghouse Freight Brake). FIGS. 613-4. The rod which butts against the brake cylinder piston and transmits its thrust.

PUTTY. A mixture of linseed oil with whiting, which latter is chalk finely pulverized. Water is sometimes added in adulteration, causing the putty to stick to the fingers, and making it hard and brittle when dry. Panel putty, used for filling nail holes in car work, is an extra quality made from whiting, white lead in oil, japan or var-

nish, and a small quantity of turpentine. The whiting is used merely to prevent the white lead from sticking to the fingers, and no more than necessary for this purpose is required. This putty forms a hard cement, which does not shrink. When dry it can be rubbed down with pumice stone or dusted with sandpaper. Glycerine putty is made of good thick glycerine and white lead or litharge. It hardens in 15 to 45 minutes, and stands water and acids.

PYRAMIDAL HOPPER BOTTOM. FIGS. 23, 31, etc. See, HOPPER BOTTOM.

Q

QUADRANT. A piece of metal curved in the form of the arc of a circle. See, SECTOR. See also, DECK SASH QUADRANT. LEVER QUADRANT (Engineers' Valve), 124, FIGS. 968-71.

QUADRANT (Steam Shovel), 16, FIGS. 357-59.

QUADRANT LATCH (Engineers' Valve), 172, FIGS. 968-71.

QUADRANT LEVERS (Steam Shovel), 17, FIGS. 357-59.

QUADRUPLET (of Elliptic Springs). FIGS. 4142-45. Four springs side by side acting as one.

QUARTER LIGHT MOLDING, or GLASS FRAME STILE (English). The upright member of the fixed window framing. The glass is very generally fitted direct to the body, a strip of rubber being interposed, and the molding screwed on outside, keeping the whole in position.

QUARTER LIGHT, OR SIDE LIGHT (English). American equivalent, window. In a carriage, the window in the body as distinguished from the windows in the doors. The quarter lights, in English practice, are always fixed, but on the continent of Europe they are invariably made to fall or open, and this is also the case with the vehicles made in England and exported to warm climates.

QUARTER LIGHT PANEL (English). A panel on the outside of the body, placed above the window. Other exterior panels are quarter panel, waist panel, and bottom side panel. Interior panels are the partition panel, inside top light panel and roof panels.

QUARTER LIGHT PILLAR (English). A part of the body framing of a carriage. A vertical post forming one side of the window aperture.

QUARTETTE (Elliptic Spring). Also called QUADRUPLETS, which see.

QUEEN POST (of a Truss). One of a pair of vertical posts against which the truss rod bears. When one post only is used, it is called a KING POST, which see. Such posts are used for the body truss rods under car bodies and occasionally trucks. See, BODY QUEEN POST. INVERTED BODY QUEEN POST. TRUCK FRAME QUEEN POST.

QUEEN POST STAY. A bar attached to a queen post to stay it laterally. See, BODY QUEEN POST STAY.

QUICK ACTING AIR BRAKE (Westinghouse and New York). FIGS. 891, 895, etc. A system now almost universally used equipped with quick acting triple valves to permit the rapid successive application of brakes throughout the train.

QUINTUPLET (of Elliptic Springs). Five springs side by side acting as one. FIGS. 4140-41.

QUICK ACTING PASSENGER TRIPLE VALVE (Westinghouse Air Brake). FIG. 910. See, TRIPLE VALVE.

QUICK ACTION VALVE (Triple Valve). 138, FIGS. 959-62.

QUICK ACTION VALVE PISTON, SPRING AND CAP (Triple Valve). 137, 140-141, FIGS. 959-62.

R

RABBET. "A rectangular groove made longitudinally along the edge of one piece to receive the edge of another. It is common in paneling, and in door frames for the door to shut into."—Knight. Rabbet is a corruption of the word rebate.

RABBETED LOCK. "A kind of lock whose face plate is sunk within a rabbet cut in the edge of a door."—Knight. See, LOCK.

RACE HORSE BOX (English). American equivalent, horse car. A four wheeled covered vehicle adapted to run on passenger trains and to carry valuable and excitable horses. The mangers, stalls, etc., are carefully padded. and a compartment provided for the jockey, who can reach the horse's head.

RACK. 1. "A frame for receiving various articles."—Webster. See, BASKET RACK. BRUSH AND COMB RACK. CARD RACK. HEAD BOARD RACK. TOWEL RACK.

2. "In machinery, a rectilineal sliding piece, with teeth cut on its edge for working with a wheel."—Brande. A RATCHET, which see.

RACK CATCH (for Head Board). A small cupboard catch to hold the head board pocket closed.

RADIATING DRAFT BAR (Street Cars). A draw bar pivoted so that it may be swung oblique to the car length over a draw bar sector. A center draft draw bar is an example of a radiating draft bar.

RADIATOR. 1. Baker and other steam and hot water heaters. FIGS. 2273-74; shown in plan, FIG. 2987. A piece of iron pipe bent into a U-shape under the seats of a car, through which the hot water or steam circulates.

RADIATOR STAND (Baker and Other Heaters). FIGS. 2266-68. A support for a radiator.

RAFTER. A timber to support the roof of a car, which extends part way across the top, either from the plate to the ridge of the roof, or to the base of the deck side only, as 101, FIGS. 360-72, 385-87, 388-91, etc. When such timbers extend all the way across they are called carlines. See, MAIN RAFTER.

RAIL. "The horizontal part in any piece of framing or paneling."—Webster.

RAIL ROOF MOLDING (Street Car). A roof deck sill molding. Its use is to make a tight joint between the roof boards and deck sill, or upper deck bottom rail.

RAILING. "A series of rails; a fence."—Webster. See, PLATFORM RAILING. STEP RAILING (Street Cars).

RAILING CHAIN. See, PLATFORM RAILING CHAIN.

RAILROAD CAR. See, CAR.

RAILROAD LANTERN. FIGS. 2730-37. A lantern used in large numbers by trainmen and other employes of railroads. A variety of patterns exist and are shown.

RAISED ROOF. An UPPER DECK or CLEAR STORY, which see.

RANGES AND COOK STOVES. FIGS. 2738-48. A range is a fixed and more elaborate cook stove attached to the wall, and, in houses, usually built in with brick so as to need no stove pipe to connect with the chimney.

RATCHET. A serrated edge, sometimes straight and sometimes on a wheel, into which a pawl engages, for producing or (more commonly) restraining motion. See, BRAKE RATCHET WHEEL. WINDING SHAFT RATCHET WHEEL. An undulating ratchet is one having no sharp edges, so that the ratchet catch will slide over them without removal on the application of force, as in deck sash pivots, FIGS. 3554-57. See, BOTTOM RATCHET. See also, DECK SASH PIVOT, FIGS. 3554-57, for various forms of ratchets and attached parts used in connection therewith.

RATCHET BURNER (for Lard Oil). One in which the wick is moved up and down by a pointed wheel engaging in it, like mineral oil burners.

RATCHET WHEEL. See, BRAKE RATCHET WHEEL. WINDING SHAFT RATCHET WHEEL.

RATTAN SEATING (Canvas Lined). FIG. 3250. See, CANVAS LINED.

RAVE. 15, FIGS. 4722-27. A vertical side piece to the frame of a wagon body or other vehicle. The term is applied to such parts on hand cars (the raves being also called seat risers), but not to other railroad cars, although literally applicable, for instance, to the sides of a gondola car.

REACH. See, EXTENSION REACH.

REAR SHEATH (Security Car Door). FIGS. 661-3.

REBATE. "In architecture, a groove or channel sunk on the edge of a piece of timber."—Webster. Usually written RABBET, which see.

RECEIVER (Pintsch System). FIG. 2471. A cylindrical steel tank, with riveted and soldered seams, adapted to receive and retain gas at high pressures. The sizes vary in diameter from 16½ ins. to 20½ ins., and in length from 6 ft. 1 in. to 9 ft. 6 ins. According to requirements, cars are equipped with from one to four receivers, connected by ¼ in. high pressure piping, etc. See, PINTSCH GAS APPARATUS.

RECEIVER FILLING VALVE (Pintsch Gas Lighting). F, FIG. 2466; FIG. 2468. A valve of peculiar construction for the admission of the compressed gas to the receiver, so that it can be transmitted to the regulator for consumption.

RECLINING CHAIR. FIGS. 3171-72, etc. A chair the back of which can be inclined to almost any angle, and which is provided with leg and foot rests.

RECLINING CAR SEAT. FIGS. 3171-72, etc. A car seat the back and cushion of which can be tilted into a comfortable reclining position, and which, together with a leg and foot rest, make a seat in which people try to sleep. They are always divided by a division arm and intended for two persons.

RECOMMENDED PRACTICE. FIGS. 4490-4713. "Those forms, parts, constructions, units, measurements or systems which are conducive of sound construction, good practice and safe operation, but which do not affect either interchangeability of parts or interchangeability of cars as a whole. See, MASTER CAR BUILDERS' STANDARDS.

RECORDING BELL (Street Cars). A bell attached to a bell punch or other instrument on which the conductor records the fares collected, to indicate that fact to the passengers.

REDUCER (Pipe Fittings). FIG. 2272. A means of decreasing the diameter of the pipe used. They are either BUSHINGS, COUPLINGS or T's, which see.

REDUCING PIPE COUPLING. FIGS 2272, etc. See, REDUCER.

REDUCING TEE, OR T (Pipe Fittings). See also, REDUCER and T.

REDUCING VALVE (Train Signal Apparatus). FIG. 981. A valve for reducing the pressure of air admitted to the train signal pipes below that maintained in the brake pipes and main reservoir. In the train signal apparatus a very low pressure, not usually exceeding two atmospheres, is used.

REFERENCE GAGE FOR MOUNTING WHEELS. (M. C. B. Standard.) FIG. 4368. In 1896 a new standard reference gage for mounting and inspecting wheels was adopted by letter ballot to take the place of the check gage for mounting wheels, formerly shown on Sheet 12, and the gage for distance between wheels, formerly shown on Sheet 7. At same date a standard check gage was adopted, both as shown on Sheet 12. See Proceedings 1896.

REFLECTORS (Pintsch System). FIGS. 2537-47.

REFRIGERATOR (of a Refrigerator Car). The chamber, constituting the main body of the car, in which the paying load is placed.

REFRIGERATOR CAR. FIGS. 6, 8-13, 185-207; details, FIGS. 196-207. A car for carrying perishable articles, especially meat, constructed with compartments in which ice is carried, and with double floor, sides and roof, to keep the ice from melting. A great variety of types have been designed, but they can all be reduced to four general classes, viz.: Those which use ice and salt, or ice only, for refrigerating, and those which carry ice overhead in ice pans or in the ends of the cars in ice racks or tubes. The most important difference of all in refrigerator cars, the difference in the character of the circulation and dryness of air, is not touched by the classification, nor can it be gone into. The temperature aimed at is about 40 degrees F., or 8 degrees above freezing. Many of the older cars were mere air tight boxes, without any circulation whatever, with the effect that an unnecessarily low temperature was required in one part of the car to keep all cool enough. The principal difference in the external appearance of refrigerator cars, as may be seen, is their greater height and width. Refrigerator cars using salt use from 1 to 2 bushels for each 100 lbs. of ice.

REFRIGERATOR CAR DOORS. FIGS. 1067-72.

REFRIGERATOR DOOR HINGE. FIG. 1968.

REFRIGERATOR EXPRESS CAR. A car that does not differ from a regular baggage and express car, except that about one-third of it is partitioned off, insulated and iced to maintain a low temperature, and in which are carried perishable goods.

REGISTER. An aperture for the passage of air, provided with suitable valves, doors and sliding or revolving plates, by which the aperture is opened or closed. See, FEED DOOR REGISTER. FRIEZE VENTILATOR REGISTER. VENTILATING REGISTER.

REGISTER FACE. A grating with which the opening of a register is covered. It is usually of some ornamental pattern.

REGULATING. An unusual term for switching, or the act of moving cars from one track to another in making up or separating trains. Also called drilling, or, in England, marshaling, or, less correctly, shunting.

REGULATING NUT SPRING (Pump Governor). 40 and 41, FIGS. 947-50; 10, FIGS. 963-64. (Safety Valve) 3 and 4, FIGS. 951; (Reducing Valve) 11 and 12, FIG. 952.

REGULATING VALVE (Pintsch Gas Pressure Regulator). See, PRESSURE REGULATOR.

REGULATOR (Pintsch System of Gas Lighting). An automatic regulator which receives the gas from the receiver at its inlet at any pressure from 1 to 300 lbs. and automatically reduces it to an outlet pressure of ½ oz. It is screwed to a board, having a recess 12¾ ins. diameter and ⅜ in. deep to receive the upper surface of the regulator, this board being held against the under side of the car floor by straps and suitable lag screws. The regulator is sealed and is guaranteed by the makers for 5 years, if returned intact and seal unbroken.

REGULATOR. See, HEAT AND DRAFT REGULATOR. FIG. 2182. PRESSURE REGULATOR.

REGULATOR STRAPS (Pintsch System). 243, FIG. 2498. An iron strap used to secure the regulator to under side of car. One is passed across each end of the board carrying the regulator, and is lag screwed to the board and to the car sills.

RELEASE COCK (Air Brake). FIG. 984. More properly an auxiliary reservoir bleeding valve. A cock attached to the auxiliary reservoir for permitting the compressed air to escape therefrom, when the locomotive is detached or when the apparatus is out of order, so as to release or "bleed" the brakes.

RELEASE SPRING. 1. (Passenger Car Trucks.) 91, FIGS. 3781-3951, and FIGS. 3852-55. A spring attached to the end piece of a truck for the purpose of throwing the brakes out of contact with the wheels. The name is also applied to any spring used to throw the brakes off from the wheels.

2. (Westinghouse Brake.) 12, FIG. 916, and 9, FIGS. 918-19. A spiral spring which acts so as to move the brake piston inward, and thus release the brakes from the wheels after the compressed air is allowed to escape from the cylinders. It was formerly carried outside the brake cylinder by a release spring bracket, etc., but is now placed inside the cylinder.

RELEASE VALVE (Air Brake). FIG. 984. A valve placed on the top of the auxiliary reservoir to release under excessive pressure or to be opened by the release valve rod

from the side of the car to bleed the reservoir and release the brakes.

RELEASE VALVE ROD. FIGS. 605-6. A rod extending from the release valve on the auxiliary reservoir to the side of the car to operate the release valve.

RELEASE VALVE ROD GUIDE. FIGS. 587-8. A guide for the RELEASE VALVE ROD, which see.

RESERVOIR. 1. (Air Brake Apparatus.) The main reservoir, FIG. 931, goes under the locomotive, and the auxiliary reservoir, FIGS. 933-35, under the tender and each car. In the Westinghouse freight brake, FIGS. 918-19, the auxiliary reservoir is connected with the brake cylinder and triple valve.

2. See, LAMP RESERVOIR, or LAMP FOUNT.

3. (Pintsch Gas Lighting Apparatus.) See, RECEIVER.

RESERVOIR DRAIN COCK (Air Brake). FIG. 974. A cock for emptying the reservoir of any water condensed from the air. Also used as a RELEASE COCK, or CYLINDER RELEASE COCK, which see, for letting off or "bleeding" the brake.

RESERVOIR PIPE (Air Brake). Also called air pipe and discharge pipe. The pipe conveying the air from the air pump to the reservoir.

RESERVOIR UNION. FIG. 924. See, UNION.

REST. That which supports something or on which it rests. See,

ARM REST.
BERTH REST.
FOOT REST.
GRATE REST.
SIDE FOOT REST.
SIDE REST (Tip Car).
STAKE REST.
UPPER BERTH REST.
WINDOW BLIND REST.
WINDOW SASH REST (Street Cars).

RETAINING RING (for Wheel Tires). FIGS. 4225, etc. A ring securing the tire to the wheel. See, MANSELL RETAINING RING and TIRE FASTENING.

RETURN BEND (Pipe Fittings). FIGS. 2275-76. A short cast iron U-shaped tube for uniting the ends of two wrought iron pipes. They are called close return bends, or open return bends, according as the section of the pipe is kept a distinct circle at all points. The close return bend has simply a partition dividing the two parts for a short distance.

RETURN HEATING SYSTEM. In this arrangement, by means of a second drain pipe, the condensed steam, after performing its work, is returned to the locomotive, instead of being discharged to the ground.

Special valves on the car, and a suction pump on the tender, are necessary adjuncts of this system. By means of the pump a vacuum of 15 to 22 inches is constantly maintained on the second or return train pipe. The returned condensation being at a high temperature when reaching the tender tank, a saving of fuel is thereby effected. Lower steam pressures can be used with this system than with the others; the exhaust of the suction pump alone is sometimes sufficient to keep up the circulation.

RETURN TAG. A tag attached to cars, usually by slipping it on to the shackle of the seal, and used as an evidence of the due arrival of the car, or as a direction to what point the car itself is to be returned.

REVERSER. FIG. 4836. See, CONTROL SYSTEM.

REVERSIBLE CAR SEAT. A name sometimes applied to the common form of car seat in which the back only reverses, but more properly applied to a seat in which the seat is moved and not the seat back only, what was the seat becoming the seat back, and vice versa.

REVERSING VALVE (Westinghouse Air Pump). 72, FIGS. 893-94. A slide valve working in a small cylinder in the steam cylinder head, and thus controlling the admission and exhaust of steam to and from the reversing piston. See, REVERSING VALVE STEM.

REVERSING VALVE BUSH, OR BUSHING (Westinghouse Air Pump). 73, FIGS. 893-94. See, BUSHING.

REVERSING VALVE CAP, OR CHAMBER CAP (Westinghouse Air Pump). 74, FIGS. 893-94. A screw plug which holds the reversing valve bushing in its place.

REVERSING VALVE PLATE (Westinghouse Air Pump). 69, FIGS. 893-94.

REVERSING VALVE PLATE BOLT (Westinghouse Air Pump). 70, FIGS. 893-94.

REVERSING VALVE STEM, OR ROD (Westinghouse Air Pump). 71, FIGS. 893-94. A rod attached at the upper end to the reversing valve. It extends downward into a hole bored into the piston rod, and is moved by the piston at each end of its stroke. The admission and exhaust of steam above the reversing piston is changed at each end of the stroke of the main steam piston, and by this means the main valves are shifted and made to admit steam, alternately, above and below the steam piston.

REVOLVING CHAIR. FIGS. 3157-65, 3224-25. See, PARLOR CAR CHAIR.

RHEOSTAT. FIG. 4876. A resistance used in connection with the controller for limiting the current taken by the motors during acceleration. Usually consists of a number of iron grids or strips of iron ribbon properly connected together and packed in a substantial frame, the whole being mounted on the under side of the car flooring.

RIB (of a Cast Iron Wheel). A bracket. See, WHEEL RIB, CAR WHEEL.

RICHARDS PANEL BACK SEATS. FIGS. 3224-25. A car seat made with a loose panel in the back, supported by springs set in the seat back frame. The panel pushes back and accommodates itself to the occupant's back, making a very comfortable chair. This principle is used on parlor car chairs in all Pullman cars, as shown in FIG. 3225.

RIDGE. See, ROOF RIDGE.

RIDGE CLAMP. The grooved stick on top of the boarding of a pitched roof directly over the ridge pole. In the Winslow car roof they are called simply ROOF STRIPS, which see.

RIDGE POLE. 84, FIGS. 159-69, etc. A longitudinal timber in the center of a roof, supported by the carlines or rafters on which the roof boards rest. In some cases the rafters are framed into the ridge pole, and in some cases the ridge pole is grooved to receive the roof sheets.

RIDGE TIMBER. A timber which caps the intersection of two inclined floors meeting in the center of the car, as in side dump or ore cars. If the inclined floors were the two sides of a gable roof the ridge timber would then become a ridge pole.

RIGHT AND LEFT SCREW. A pair of screw threads cut turning in opposite directions, so that a common nut or pipe coupling tapped with similar threads will, according to the direction in which it is turned, draw the two rods nearer together or press them farther apart.

RIGID BOLSTER TRUCK. FIGS. 3760-64, etc. A car truck with a bolster which has no LATERAL or SWING MOTION, which see. See also, BOLSTER and TRUCK BOLSTER.

RIGID CASTER (for Tables). FIG. 3352. See, CASTER. A "rigid caster" is a mere socket and not properly a caster at all, except from being used in the same manner as a finish for legs of tables and chairs.

RIM. 1. (Of a Car Wheel.) That portion of a car wheel outside of the plate. The face of the rim is the outside vertical edge or face.

2. (Of a Wrought Iron Wheel.) The wrought iron ring which is welded to the outer ends of the spokes and surrounded by the tire.

RIM LATCH. FIG. 1998, etc. A latch which is attached to the outside of a door and is not let into it.

RIM LOCK. FIGS. 2003-90. "A lock having an exterior metallic case which projects from the face of the door, differing thus from a mortise lock."—Knight.

RING. 1. See,

ASH PIT RING.
PACKING RING.

CASING RING.
GRATE RING.
INSIDE RING.
LAMP RING.
MANSELL RETAINING RING.
MANHOLE RING.
PULL RING.
RUBBER PACKING RING.
SLEWING RING.
STOVE PIPE RING.
TOP RING.
VENTILATOR RING.
WINDOW CURTAIN RING.

2. (Baker Heater.) FIGS. 2184, 2193. A cast iron ring attached to the smoke top to stiffen it and hold the feed door. Also an ash pit ring.

RISER. 3, FIGS. 2798-2800. A piece of marble or metal set on edge around about the wash bowls to prevent water from running against the walls. See, STEP RISER. SEAT RISER.

RISING TIMBER. A timber placed upon another parallel or transverse timber to get greater height.

RIVET. "A pin of iron or other metal, with a head drawn through a piece of timber or metal, and the point bent or spread and beaten down fast to prevent it being drawn out, or a pin or bolt clinched at both ends."—Webster. See, COUPLING LINK RIVET. The SEAT ARM PIVOT, which see, FIGS. 3281-86, is usually in the trade termed a rivet, but incorrectly.

RIVET FASTENING (English). As applied to railroad wheels, the oldest and most defective mode of securing the tire to the wheel. Little used. See, TIRE FASTENING.

RIVET SEAL. A seal with a lead rivet, which is closed by a die. See, CAR SEAL.

ROCKER (Tip Car). A crescent shaped casting bolted to the rocker timbers of the car body on which the body rests and rolls when the body is tipped.

ROCKER BEARING (Tip Car). The iron cap for the rocker bearing timber to support the rocker.

ROCKER BEARING TIMBER (Tip Car). A horizontal timber at the end of the car, on which the rocker bearing rests.

ROCKER BEARING TIMBER HANGERS (Tip Car). Vertical timbers or iron bars framed and bolted to the end piece, to which the rocker bearing timbers are fastened.

ROCKER CAR SEAT. A seat having the bottom adjustable, so as to give it an inclination toward the seat back in all cases, on whichever side the seat back may be placed. All modern car seats have mechanism by which this inclination is automatically given to the seat when the back is reversed or swung back. See, CAR SEAT.

ROCKER CASTING (Car Seats). A casting forming a part of the cushion carrier or stand, which is moved back and forth by the seat back arms, and moves the cushion forward, as well as giving it some inclination toward the back.

ROCKER SIDE BEARING (Trucks). FIGS. 3765-67. A device somewhat similar to the ROLLER SIDE BEARING, which see, but differing from in that the rocker plates rest on top of the springs, and the bolster on top of them, instead of having the plates rest on the truck frame and having the springs rest on them. Instead of rollers, elliptical rockers are used, which tend to offer a gradually increasing resistance to the lateral motion of the bolster and tend to return it to its normal position at all times.

ROCKER TIMBERS (Tip Car). See, ROCKER.

ROCKING BAR (Heaters). A horizontal bar which supports the grate, and on which the latter is attached by a pivot in the center so that it can be turned horizontally and thus shake down the ashes.

ROCKING LEVER. A bell crank which operates the toggle joint, to open and close King's door for hopper bottom cars.

ROCK PLANK. A TRUSS PLANK, which see.

ROD. In car building this term generally means a slender bar of iron with a nut on each end, in distinction from a bolt which has a head on one end and a nut on the other. Very long bolts, however, are often called rods. Rods in general take their name from the parts with which they are connected or the use which they serve.

ROD HANGER (Bell Cord). FIGS. 1874-75, etc. See, BELL CORD HANGER.

RODGERS BALLAST CAR AND DISTRIBUTING PLOW. FIGS. 47, 48, 50. A hopper bottom car with bottom doors by which crushed stone or gravel ballast can be distributed between the rails, and a flat car with a plow attached beneath it, by which the ballast is levelled and plowed out over the ends of the ties and cleaned from the rails.

RODGERS CONVERTIBLE CAR. FIG. 48. A car which can readily be converted from a centre dump car to a gondola car with sides, ends and flat bottom.

ROE VENTILATOR. FIG. 3490. See, VENTILATORS.

ROLLED AXLE. An axle made of rolled iron. See, AXLE. CAR AXLE.

ROLLER. 1. "That which rolls; that which turns on its own axis, particularly a cylinder of wood, stone, metal, etc."—Webster.

2. (Window Shades.) FIG. 3724. The cylinder on which the shade is rolled up, containing within it the springs which actuate it. See, HARTSHORN and MCKAY SHADE ROLLER.

ROLLER SIDE BEARING TRUCK. FIGS. 3729, 3735-37. A lateral motion diamond truck whose frame is very like a swing motion truck (FIGS. 3745-53), with a rigid spring plank. Lateral motion is given to the truck bolster by placing it upon cylindrical rollers resting upon the spring caps. The spring cap and bolster bearing plate are concaved, so that the motion of the rollers is restrained and the truck bolster given stability. See, ROCKER SIDE BEARING TRUCK.

ROLLER SIDE BEARINGS, BODY AND TRUCK. FIGS. 4123-27. See, ANTI-FRICTION SIDE BEARINGS.

ROOF. FIGS. 1714-77. "The cover or upper part of a house or other building, consisting of rafters covered with boards, shingles, or tiles, with a side or sides sloping from the ridge for the purpose of carrying off the water that falls in rain or snow."—Webster. The roof of passenger cars is in two parts, commonly called the UPPER and LOWER DECK, which see. See, CAR ROOF; also,

ARCHED ROOF.
"A" CAR ROOF.
CORRUGATED METAL CAR ROOF.
DOUBLE BOARD ROOF.
PLATFORM ROOF.
PITCHING ROOF.
SINGLE BOARD ROOF.
WINSLOW ROOF.
"X" ROOF.

ROOF APRON. 106, FIGS. 360-72, 388-91, etc. A vertical or inclined metal or wooden screen attached to the end of a passenger car roof to prevent cinders, rain, or snow from being driven on to the platform and into the doorway.

ROOF ASCENDING RAIL (English). See, ASCENDING RAIL.

ROOF BOARDS. 1. 86, FIGS. 159-69; 102, FIGS. 360-72, 385-87, 388-91. The boards which form a covering of a roof. They run longitudinally on passenger cars and usually transversely on freight cars. See, CAR ROOF.

2. (English.) The planking forming the roof. It invariably runs longitudinally.

ROOF BRACE (of a Center Lamp or Chandelier). Diagonal stays passing from the lamp to the roof. Vertical supporting stays are known as lamp arms, with or without a large center stay.

ROOF COMMODE HANDLE (English). See, ASCENDING RAIL.

ROOF CORNER CASTING (Passenger Cars). A cast iron molding for the corners of platform roofs. They are made rights and lefts, and are specified as for a person standing and facing the end of the car.

ROOF COVER STRIPS (Single Board Roofs). A metallic U-shaped strip used to cover the joints of the roof sheets. See, ROOF STRIP.

ROOF HAND RAIL. A hand rail usually made of gas pipe in front of the brake wheel, designed to protect the brakeman when applying the brakes. It is stiffened by a hand rail brace. The whole arrangement is designed to take the place of the brake step, which has been disapproved of by vote of the M. C. B. Association. See, BRAKE STEP.

ROOF GRAB IRON (Box and Stock Cars). 60, FIGS. 159-69, etc. A hand hold. An iron bar fastened to the roof to be grasped when ascending the ladder at the end of the car. Also called ladder handle. See, GRAB IRON.

ROOF LAMP (English). A lamp used to illuminate the inside of a carriage or other covered vehicle. A circular hole, about 8 in. diameter, is cut through the roof, and the roof lamp placed in this aperture from the outside, the glass and burner when in position being a little below the inner surface of the roof, and entirely inaccessible from within. This form of lamp is wasteful of oil, yields a dim and uncertain light, is costly to handle and the glass is constantly broken. It is therefore being superseded in Germany and England by Pintsch's, Pope's, and similar methods of using compressed oil gas.

ROOF LANDING. A small platform built on the roof of a trolley car on which inspectors step in climbing upon the room to inspect the trolley. In freight cars it is called a roof step.

ROOF LIGHT. A DECK SASH, which see. See also, END ROOF LIGHT (Street Cars).

ROOF PANEL (End). The panel over the door of a passenger car.

ROOF RIDGE (Freight Cars). The intersection of the two plane surfaces forming a pitching roof.

ROOF RUNNING BOARD. 87, FIGS. 159-69, etc. See, RUNNING BOARD.

ROOF RUNNING BOARD BRACKET. 89, FIGS. 159-69, etc. See, RUNNING BOARD BRACKET.

ROOF RUNNING BOARD EXTENSION. 88, FIGS. 159-69, etc. See, RUNNING BOARD EXTENSION.

ROOF SHEETS. Metallic sheets, sometimes corrugated and sometimes not, for covering freight car roofs. Their joints are sometimes closed by a roof cover strip, and sometimes the edges fit into grooves in wooden carlines or joint strips. See, CAR ROOF.

ROOF STEP (Freight Car Roofs). A horizontal board which extends sidewise from the running board to near the side of the car above the ladder, its object being to give a secure foothold and protect the roof from wear. It is not much in use.

ROOF STICK, or HOOP STICK (English). American equivalent, carline. A piece of timber which supports the planking of the roof, and is either bent or cut to the curve of the roof.

ROOF STRAP (Street Cars). See, DIAGONAL ROOF STRAP.

ROOF STRIPS. 1. Used quite frequently, but somewhat confusedly, to designate a PURLIN, which see.

2. Passenger Cars. Narrow wooden strips attached as stiffeners to the under side of the carlines of the lower deck.

3. (Winslow and Other Car Roofs). FIGS. 1714-26. A longitudinal wooden strip on top of the metal roof sheets to which the roof boards are attached. The central roof strip is called in other roofs a ridge clamp. Sometimes at the ridge a single ridge clamp is used.

ROOF THIMBLE (Pintsch Lamp). 291, FIGS. 2605-21.

ROOF VENTILATOR. See, VENTILATOR.

ROOFING CANVAS. A heavy duck for covering the outside of the roofs of cars, chiefly used on street cars.

In England it is universally used for all cars with roofs. It is bedded on fresh thick white lead or SMUDGE (which see), and then receives several coats of the same paint.

ROOFING DUCK. The trade name for the cloth used for head linings, manufactured in any width up to 12 ft. It is lighter than roofing canvas.

ROPE. "A large string or line composed of several strands twisted together."—Webster. See, BERTH SAFETY ROPE. BERTH SPRING ROPE.

ROPING STAPLE. 58, FIGS. 159-69. A U-bolt secured to the side sill near the end of a car into which the hook of a switching rope may be caught, so that a switching locomotive may pull cars on side tracks while it is on the main track, or vice versa.

ROSE. FIGS. 1983-87. See, DOOR LATCH ROSE. Sometimes called a rosette.

ROSS, OR SKELETON "U" BRAKE SHOE. FIG. 1005. A brake shoe of semi-steel having extended tapering ends hardened by chilling from the back.

ROTARY SNOW SHOVEL. See, SNOW SHOVEL.

ROTARY VALVE (Engineer's Valve, etc.). 14, FIGS. 907-09.

ROTARY VALVE KEY (Engineer's Valve, etc.). 12, FIGS. 907-09.

ROTARY VALVE SEAT (Engineer's Valve, etc.). 3, FIGS. 907-09.

ROUGH STUFF, OR SCRAPING FILLING COAT (Painting). The next coat after the PRIMING, which see. Its purpose is not to protect, but to level the surface of the wood. Therefore, none of it is left on the higher portions of the surface, but used merely to fill the hollows to a level with these. The surface is scraped to an even plane level with the highest level of the bare wood. After 24 hours to dry, a second coat is put on, scraped down to the level of the highest portions of the bare wood. After a second 24 hours to dry, the car is sand papered or rubbed down, pumice stoned, and is ready for the COLOR COATS, which see. See also, PAINTING. A common material for this coat is 6 lbs. keg white lead, 7 lbs. whiting, mixed thick with coat japan and ground in a paint mill. This mixture is thinned with turpentine, so as to be thin enough to work easily, and so thick as not to run. It is put on with a leveler or scraper, often made of an old saw blade.

ROUND (of a Ladder). 59, FIGS. 159-69, etc. The horizontal bars on which the foot rests. They are called rounds, whether of wood or iron, and whether round or square. See, LADDER ROUNDS.

ROUND CORNERED CAR. A method of finishing the ends of passenger cars by omitting the corner posts and rounding them off to a very large radius. It is exceptional and quite out of use.

RUBBER FLOOR MAT. FIGS. 2174-75. There are two leading styles, corrugated rubber and perforated rubber.

RUBBER GASKET. See GASKET.

RUBBER SPRING. A car spring made of india rubber. They are rarely used, it having been found difficult to secure uniform quality, and the cost of a really good quality being higher than steel spiral springs of equal efficiency and durability. The same is true of the various rubber and steel compound springs. Rubber springs are in occasional use on platform safety chains for passenger equipment, and in England they are used for draft and buffing.

RUBBER TREAD (for Step). An india rubber covering fastened to a step, or threshold plate, of a car to prevent persons from slipping when ascending or descending the steps.

RUBEROID CAR ROOF. FIG. 1748. A composition material intended to be laid between the inside and outside board roofs.

RULES FOR INTERCHANGE. See, INTERCHANGE OF TRAFFIC.

RUNNERS (Foundry). Apertures which connect the ingate of a mold for casting metals with spaces to be filled with molten metal.

RUNNING BOARD. 1. 87, FIGS. 159-69, etc. A plane surface, made usually of boards, for train men to walk or run on. It is placed on the roof of box or stock cars and at the side of tank cars. Gondola and flat cars usually

have none, but hopper bottom cars sometimes have a running board passing over the tops of the end rails and drop door beam.

2. (Tank Car.) 119, FIGS. 325-37. The only substitute for a car floor.

RUNNING BOARD BLOCKING. 86a, FIGS. 159-69. Rectangular shaped blocks, the acute angle of which is the same as the slope of the car roof. Inserted under the running boards to level them up and to give them a bearing on the roof boards over the carlines.

RUNNING BOARD BRACKET. 1. 89, FIGS. 159-69, etc. See below.

2. (Tank Car.) Cast iron knees attached to the main sills of a tank car, and projecting outward to support the running board.

RUNNING BOARD EXTENSION. 88, FIGS. 159-69, etc. The part which extends beyond the end of the car body so as to bring the ends of the running boards on adjoining cars nearer together to facilitate the passage of trainmen from one car to another. See, RUNNING BOARD.

RUNNING BOARD EXTENSION BRACKET. FIGS. 566-7. A bracket to support the RUNNING BOARD EXTENSION, which see.

RUSSELL SNOW PLOWS. FIGS. 145-47.

RUSSIA IRON. A form of sheet iron manufactured in Russia the exact process for making which has heretofore been kept secret, but which consists essentially in forming a chemical compound of iron upon its surface at the same time that it is highly polished, so that it is not likely to rust. Modern substitutes for this iron are also known as PLANISHED IRON, which see.

S

SADDLE. "A seat or pad to be placed on the back of an animal to support the rider or the load."—Knight. Hence, a block or plate which acts as a bearing or support for a rod, beam, etc., in construction, is called a saddle. See, BODY TRUSS ROD SADDLE. SPRING SADDLE. TRUSS ROD SADDLE. BOLSTER TRUSS ROD SADDLE.

SAFETY BEAM (Passenger Car Trucks. 51, FIGS. 3781-3951, FIGS. 3823-4. A longitudinal timber connecting the end piece and transom above the axles and inside of each wheel piece. Iron straps (axle safety bearings) are attached to the beam and pass under the axles so as to hold them in position in case of a breakage of axles or wheels on either side. An additional middle safety beam is used on six wheel trucks, 52, FIGS. 3948-51.

SAFETY BEAM BLOCK. 53, FIGS. 3781-3951. A block fastened to the under side of a safety beam and to which a safety strap is attached. It is put there to bring the safety beam nearer to the axle, and is usually cut out so as to conform to the shape of the latter.

SAFETY BEAM IRON. 60, FIGS. 3948-51. A wrought iron bar or casting bolted to the transom (six wheeled truck), by which the middle safety beam is attached to the transoms.

SAFETY BEAM TIE ROD. 59, FIGS. 3781-3951. A longitudinal rod alongside a safety beam, tying the end piece and transom together. A safety beam truss rod sometimes serves as a substitute and equivalent.

SAFETY BEAM TRUSS ROD. A long longitudinal rod parallel with a safety beam, extending from one truck end piece to the other, under the transoms, so as to support them, in addition to serving as a substitute for SAFETY BEAM TIE RODS, which see. Not much in use to-day.

SAFETY BEAM TRUSS ROD BEARINGS. Cast or wrought iron pieces attached to the transoms. See above. Not much in use to-day.

SAFETY BEARING. See, AXLE SAFETY BEARING for safety beam above.

SAFETY BEARING THIMBLES. See, AXLE SAFETY BEARING THIMBLES.

SAFETY BERTH LATCH. A device by which it is made impossible for the berth to shut itself automatically in case of accidental overturning of the cars. These devices enable the BERTH SAFETY ROPE (which see) to be dispensed with.

SAFETY CAR HEATING AND LIGHTING CO.'S (Systems of Steam Heating). FIGS. 2395-2446. (Standard Systems.) The fundamental principle of these systems is the replacing of the heat of the Baker heater fire, by the heat of the steam from the engine, applied by means of jackets on portions of the circulation piping, but in all cases leaving the Baker heater system in such condition that a fire or steam can be used, separately, or in conjunction, without its being necessary to alter or adjust any valves or other devices whatsoever. These systems are all closed circulation, the seal of the Baker heater being unbroken, and, therefore, no reduction of the water in the pipes, and danger of burning out of the coil. Salt water may be used and is recommended.

Details of the various applications to single and double circulation are given in FIGS. 2395-97. The water circulation being heated at from three to six different points (instead of one point, as when fire is used in the Baker heater) it produces more rapid and more equable heating of the car. See, COIL JACKET SYSTEM and RETURN HEATING SYSTEM.

A system of direct steam heating is shown in FIG. 2398.

SAFETY CHAIN. 1. See, BRAKE SAFETY CHAIN (for brake beams). SAFETY COUPLING CHAIN (for draw gear), FIGS. 4532-36.

2. (English.) American equivalent, safety coupling chain. An additional coupling chain provided at one end with a hook, and intended to hold the train together should the main coupling part. Two are secured at each end of the vehicle, one on each side of the main coupling. Also called side chain.

SAFETY CHAINS, FREIGHT CAR (M. C. B. Recommended Practice, as to location of). FIGS. 4532-36.

SAFETY CHAIN EYE BOLT, OR STRAP BOLT. See, BRAKE SAFETY CHAIN EYE BOLT.

SAFETY COUPLING CHAIN (Passenger Car Platforms). FIGS. 728-31 and 4532-36. 1. A chain attached to the platform end timber and hooked to an eye in the platform of an adjoining car or tender so as to prevent the train from being separated in case the coupling should be detached. They are necessarily used in pairs, an eye and a chain with hook being attached to opposite sides of the same platform.

2. (M. C. B. Recommended Practice.) FIGS. 4532-36. In 1893 a Recommended Practice was adopted for location and details of platform safety chains for passenger equipment cars. See Proceedings 1890 and 1893. In 1896 this was modified as follows: Platform safety chains for passenger equipment cars to be located 14½ inches each side of center; to be suitably attached to under side of platform timbers, and to be of such length that when extended horizontally the chain with hook shall measure 12¾ inches from face of end timber to bearing point of hook, and the chain with eye shall measure 2¾ inches from face of end timber to bearing point of eye. The hook shall not be more than 1¼ inches thick transversely, and the eye shall not be less than 1½ inches wide, or less than 4 inches long in its opening. When facing end of car the chain fitted with hook shall be on the left hand side, and the chain fitted with eye on the right hand side.

In 1894 a Recommended Practice was adopted for safety chains for freight cars, when such chains are used. The use of safety chains on freight cars was not recommended, but when they are used on cars for special services a location is recommended as shown.

SAFETY'S DIRECT STEAM SYSTEM. FIG. 2398. This depends for its efficiency upon the close regulation of steam

supply possible with the special inlet valve, 603A. This valve has a Jenkins Seat, and is so constructed that the first full turn of the handwheel only opens the valve enough to give $\frac{1}{100}$ sq. in. area of the inlet port. It can be adjusted by the wheel so as to give any desired inlet area from that point to the full area of 1 inch pipe. By this means the flow of steam to the radiator pipes (and therefore the car temperature) can be closely regulated.

SAFETY GATE. See, PLATFORM GATE.

SAFETY GUARD (for Spring Plank). FIGS. 3873-75. An iron strap attached to the truck transoms and passing under the spring plank to hold up the latter in case of accidental breaking of the link hangers. More properly SPRING PLANK SAFETY STRAP, which see.

SAFETY HANGER. See above, also, BRAKE SAFETY CHAIN. BRAKE SAFETY STRAP. SAFETY HANGER (for Lower Brake Rod).

SAFETY HANGER (for Lower Brake Rod). A metal loop or eye attached to a truck and through which the lower brake rod passes. It is intended to prevent the brake rod from falling on the track in case it or its connections should break.

SAFETY LATCHES. See, SAFETY BERTH LATCH.

SAFETY PLATE (Baker Fireproof Heaters). FIGS. 2197, 2219. An iron plate which covers the hole in the partition between the fire pot and base of smoke flue. Its office is to prevent the ignited coals from falling out if the heater be overturned. It is operated by a safety plate handle, FIGS. 2197, 2219, the safety plate sliding between safety plate guides, FIG. 2216. The safety plate is held closed by a safety plate spring, FIG. 2198, bearing upon the safety plate handle.

SAFETY PLATE AND GAS PREVENTOR (Baker's Perfected Heater). FIG. 2247. This is a cover for the fire pot with an upturned flange, and is fitted to the top, FIG. 2245. It has an upturned flange along its hinged axis which deflects the cool air that enters when the door is opened, and prevents its mixing with the gases which escape from the fire pot through the holes in the top, FIG. 2245. The gases remaining hot pass up through the smoke flue and do not escape into the car.

SAFETY PLATE GUIDE. See, SAFETY PLATE.

SAFETY PLATE HANDLE. See, SAFETY PLATE.

SAFETY PLATE SPRING. See, SAFETY PLATE.

SAFETY ROD (Postal Cars). A rod suspended from overhead, over the pouch racks, within easy reach, to serve as a hand hold or grab iron in case of derailment, etc. Certain fittings, FIGS. 3070-72, are used to fasten it to the roof or sides of car; they are the safety rod brackets, bushings and T joints.

SAFETY ROPE (for Sleeping Car Berths). 26, FIGS. 1778-80. More properly BERTH SAFETY ROPE, which see. See also, SAFETY BERTH LATCH.

SAFETY STRAIGHT PORT COUPLER. FIGS. 2439-46. A straight port steam hose coupler used on all equipments of the Safety Car Heating and Lighting Co.

SAFETY STRAP. See, AXLE SAFETY STRAP. BRAKE SAFETY STRAP. SPRING PLANK SAFETY STRAP.

SAFETY VALVE. 1. (Baker Heater.) FIGS. 2260-61. A valve formed of an india rubber ball, with which an opening on top of the circulating drum is closed. When the pressure in the drum exceeds the elasticity of the rubber ball the latter permits the steam or hot water to escape, and thus relieve the former. This safety valve is little used now, it having been replaced by a safety vent or bushing, FIG. 2241. The latter is simply a cast iron cap, the top of which is cut out so that if the pressure in the pipes becomes too high the top will blow out and relieve it. A new cap must be supplied whenever the pressure exceeds the limit and the head of the safety vent is blown out.

2. (High Speed Brake.) A valve applied to the auxiliary reservoir of cars in the train, not equipped with reducing valves, to relieve the brakes from excessive pressure. FIG. 951.

SAFETY VALVE BALL (Baker Heater). See, SAFETY VALVE.

SAFETY VALVE BODY. 2, FIG. 951.

SAFETY VENT AND BUSHING. FIG. 2241. See, SAFETY VALVE.

ST. LOUIS FLUSH CAR DOOR. FIGS. 1040-41.

SALOON. 1. "A lofty, spacious apartment."—Worcester.

2. The main room in a compartment car (rarely used).

3. One of the smaller subdivisions or staterooms of a sleeping or parlor car.

4. A retiring room, furnished with urinal and closet hopper, or soil hopper; and in the more luxurious cars with a water closet. The saloon is commonly also provided with washing facilities. Other terms are lavatory, closet, toilet, etc.

SALOON CARRIAGE (English). Answers the same purpose as an excursion car, or American private car. A luxurious vehicle, one or more of which is kept for hire on most English railways, having one or more large compartments, about 15 ft. long, fitted with tables, sofas, etc., and termed saloon, is never used in England in the American sense (4) above. See also, CARRIAGE.

SALOON DOOR PLATE, OR NOTICE PLATE. FIGS. 2118-33.

SALOON FURNISHINGS. FIGS. 3089-3119.

SALOON HANDLE. FIGS. 3097-3102. See, URINAL HANDLE.

SALOON HOPPER. FIGS. 3091-95. See, CLOSET HOPPER. Also called soil hopper.

SALOON HOPPER VENTILATOR (BELL'S, which see). FIG. 3103.

SALOON LATCH. FIGS. 2086-88. A latch for saloon doors, which consists of a spring bolt, usually with a stop on the inside, which locks the bolt fast, or with a separate bolt for fastening the door from the inside. See below.

SALOON LOCK. FIGS. 2040-65. The same as a saloon latch, with provision for locking the door from the outside. Saloon latches without locking facilities are rarely used.

SALOON PAPER HOOK. FIGS. 3108-09. See, PAPER HOOK.

SALOON PLATE. See, NOTICE PLATE.

SALOON ROOF. In most of the modern cars the saloon is entirely roofed over so as to be distinct from the body of the car. Sometimes the partitions are carried up to the roof of the car.

SALOON SEAT. The wooden seat over a closet hopper.

SALOON STOP LATCH. See, SALOON LATCH.

SALOON VENTILATING JACK. See, VENTILATOR.

SAND BLAST PROCESS. A process of cutting glass by blowing sand upon it with a strong blast of air The glass is covered with paper or other elastic surface, which it is found the sand does not cut at all while rapidly cutting away the glass itself. The process was invented by observing the action of sand blown by the wind upon the rocks in the western plains of the United States, and is now largely used in place of wheel cutting.

SAND BOX (Street Cars). A box placed under the seats containing grit for sanding the tracks. It is provided with a spout and valve, operated by a lever, connecting rod and lever holder.

SAND PLANK. 43, FIGS. 3735-3951. A common name for spring plank.

SANDWICH PLATES. See, FLITCH PLATES. BODY BOLSTER FLITCH PLATES, etc.

SARGENT SKELETON BRAKE SHOE. FIG. 1006. A brake shoe of mild steel with depressions in the face so disposed as to leave the metal to wear the tire when the rail does not. Used on locomotive driving wheels.

SARGENT STEEL INSERT BRAKE SHOE. FIG. 1003. Another form of skeleton shoe serving the same purpose of giving a proportionate wear on the tire. Made with cast iron body and crucible steel inserts.

SASH. The frame of a window or blind, in which the glass or slats are set, but commonly used, especially in compound words, as a substitute for window, meaning the window and sash complete. The various members used

in framing a sash are the same as a DOOR FRAME, which see. See,

DECK SASH.	MIRROR SASH.
DOOR CASE WINDOW SASH.	SWINGING SASH.
	UPPER DOOR SASH.
DOOR LIGHT (English).	VENTILATOR SASH.
DOOR SASH.	WINDOW BLIND SASH.
LOWER DOOR SASH.	WINDOW SASH.

SASH BALANCE. FIGS. 3691-94, 3705, 3709. A spring or weight, with or without a cord, so connected to a sash as to counterbalance its weight and make it easy to raise or lower. There are numerous devices of the kind, only three of which are illustrated—O. M. Edwards, the Caldwell and the National.

SASH BAR LIFT. FIGS. 3688-90, 3699-3703. A sash lift having a projecting bar sufficiently large to be grasped by the entire hand. Chiefly used for heavy double windows, in parlor cars, etc.

SASH FASTENER. A SASH LOCK, which see.

SASH HOLDER. See, SASH LOCK. SPRING SASH HOLDER.

SASH LIFT. 43, FIGS. 1778-83; 3662-90. A metal finger hold attached to the bottom rail of a window sash for raising and lowering it. They are sometimes let in flush, and so called (FIG. 3682), but usually attached on the outside. Sometimes, but rarely, the sash lift is a mere knob, and so called. A WINDOW BLIND LIFT, FIGS. 3593-3620, which see, is a somewhat similar device. See, SASH BAR LIFT. END DOOR SASH LIFT.

SASH LOCK. FIGS. 3652-60. A spring bolt attached to a window sash, or (rarely) a window blind, provided with thumb lever (sash lock trigger), to withdraw the bolt with by one hand, while the sash is lifted by the other. Both hands must thus be used. To accomplish this end less awkwardly sash balances, FIGS. 3691-94, have been adopted. See also, DECK SASH LATCH.

In the common form of sash lock, FIG. 3648, the sash lock bolt, 1, is pressed outward by the sash lock spring, 2, and moved inward when desired by the sash lock trigger, 3. The bolt enters into a sash lock bushing, FIG. 3623, let into the parting strip or other part of the window casing. In place of the bushing, sash lock stops, FIGS. 3621-30, or sash lock plates, fastened upon the outside of the window casing, or let in flush, are sometimes used, and occasionally a sash lock rack, FIGS. 3642-43. A sash lock lower stop is often added at the bottom to hold the sash shut and prevent it from being opened from the outside.

SASH LOCK BOLT. 1, FIG. 3648. See above.

SASH LOCK BUSHING. FIGS. 3579-80. See above.

SASH LOCK LOWER STOP. See above and SASH LOCK STOP.

SASH LOCK PLATE. FIG. 3639-41. A sash lock stop. See above.

SASH LOCK RACK. FIG. 3642-43.

SASH LOCK SPRING. 2, FIG. 3648. See, SASH LOCK.

SASH LOCK STOP. FIGS. 3621-30. There are two kinds of stops, upper stops for holding the window open, and lower stops to hold it shut. Sash lock bushings, plates, or racks, are substitutes and equivalents for sash lock stops. See, SASH LOCK.

SASH LOCK TRIGGER. 3, FIG. 3648. See, SASH LOCK.

SASH OPENER. FIGS. 3504-23. A contrivance, as a lever or rod, for opening a window, used chiefly for the deck sashes, which are out of reach. See, DECK SASH OPENER.

SASH PARTING STRIP. A strip of wood attached to the window post of a passenger car which acts as a distance piece between two sashes and against which the latter slide. Also called BEAD and PARTING BEAD, which see.

SASH PIVOT. FIGS. 3528-34. A metal pin or pivot attached to a sash on which the latter turns. The term almost always means a deck sash pivot.

SASH POCKET POST (Street Car). The intermediate parts in the end of an open car, between the end sash.

SASH PROP. A WINDOW BUTTON, which see.

SASH PULL. FIGS. 3516-22. See DECK SASH PULL.

SASH PULL HOOK. FIGS. 3546-50. See, PULL HOOK.

SASH RAIL. A horizontal bar in the outside frame of a window or blind. See, WINDOW BLIND RAIL.

SASH REST (Street Cars). See, WINDOW SASH REST.

SASH SPRING. FIGS. 3575-77. A metal spring attached to the edge of the stile of a window or blind sash to prevent it from rattling. They are made of various forms. A single window sash spring consists of a metal plate, like FIG. 3577, attached to the sash at one end. A double window sash spring is a metal plate fastened in its center to the sash. Another is of a spiral form, spiral window sash springs, let into the sash.

SCANTLING (Carpentry). "Lumber under 5 inches square used for studs, braces, ties, etc. It is expressed in terms of its transverse dimensions."—Knight. An upright scantling is termed a stud.

SCARF. "A joint uniting two pieces of timber endwise. The ends of each are beveled off and projections are sometimes made in the one corresponding to concavities in the other, or a corresponding concavity in each receives a jiggle" (or packing block).—Knight. It is technically known as a ship splice, prescribed by the rules for interchange of traffic for splicing any broken sills but the center sills. See, INTERCHANGE OF TRAFFIC for the splice recommended for sills.

SCARRITT-FORNEY SEATS. FIGS. 3182-3223. Seats made by the Scarritt-Comstock Furniture Company under the Forney patents. The feature of the Forney seat is the seat back arms and the tilting of the cushion and inclinations of the back given by these arms. This is fully shown in the figures. Another feature of these seats is the adjustable foot rest, which permits luggage to be set under it out of the way as shown in FIG. 3186.

SCHEME ROD (Postal Cars). A rod supported upon the scheme rod bracket, and carrying the scheme or schedule of the proper distribution of mail matter for the various post offices used in distributing mail.

SCREEN (For Heater Room Doors, Wash Room Panels, etc.). A perforated plate of sheet metal, usually japanned, used as an ornamental finish.

SCREEN, DECK WINDOW. A wire netting extending the entire length of the clear story outside the deck sash to exclude cinders. It is usually a very fine wire netting, 64 meshes to the inch.

SCREW. 1. "A cylinder surrounded by a spiral ridge or groove, every part of which forms an equal angle with the axis of the cylinder, so that if developed on a plane surface it would be an inclined plane. It is considered as one of the mechanical powers."—Knight. When used alone the term commonly means a wood screw, having a slotted head and gimlet point, for driving in with a screw driver. Machine screws are similar, except that they have no gimlet point and have a metal screw thread. They are used for uniting metallic parts. All ordinary forms of bolts have screw threads cut on them, but are not commonly called screws. A special form of wood screw is a lag screw, which is a large sized screw with a head like a bolt, so that it may be inserted with a wrench instead of a screw driver. See, SCREW THREAD.

SCREW COUPLING (English). The means by which passenger train vehicles are coupled together. On the Continent it is used for both passenger and freight cars. It comprises a right and left handed screw provided with a hinged weighted handle, which always hangs downward, so that it has no tendency to unscrew and slacken the coupling, and two nuts with gudgeons taking in the eyes of U-shaped coupling links or shackles. The screw coupling may be either loose, or one shackle may be attached to the drawbar.

SCREW COUPLING NUT, AND GUDGEONS (English). See above.

SCREW COUPLING WEIGHTED LEVER (English). See above.

SCREW GAGES. Instruments for measuring the diameter or size of screws. They are of two kinds: external, for measuring male screws, and internal, for measuring female screws. See also, SCREW PITCH GAGE. SCREW THREAD GAGE.

SCREW JACK. FIGS. 1970, etc. A jack, the power of which depends upon a screw, turned by a lever. There are several such jacks in use, the bell base, ratchet screw jack; the differential screw jack, which has two screws, one working within the other, and the Chapman screw jack, which has a capstan head, into which a bar may be inserted.

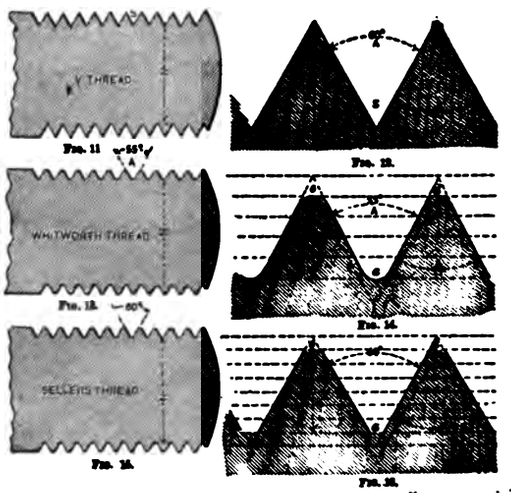
SCREW PITCH GAGE. "A gage for determining the number of threads to the inch on screws and taps. It consists of a number of toothed plates turning on a common pivot, so that the serrated edge of each may be applied to the screw until one is found which corresponds therewith. The figures stamped on the plate indicate the number of threads to the inch."—Knight. In the ordinary single thread screw the pitch is indicated by the number of threads to an inch.

SCREW THREAD. The groove, or the material between the grooves, which is cut on the outside surface of a cylinder to form a male screw, or on the inside surface of a cylindrical hole to form a nut or female screw. METAL SCREW THREADS and WOOD SCREW THREADS, which see, are of different form. PIPE SCREW THREADS, which see, are usually V-shaped, but all other threads in common use for ordinary purposes are made by the Whitworth or Sellers standard screw threads, the former being the European and the latter the American standard.

At the M. C. B. Convention, 1882, it was "Resolved, That this Association deprecates the use of screws larger or smaller in diameter by a small fraction of an inch than the sizes specified for the Sellers or Franklin Institute system, and that all the members of the Association are urged to abandon entirely the use of over or under size screws."

The Sellers or Franklin Institute system of screw threads, bolt heads and nuts is the standard of the Association, and repeated action of the Association has deprecated the use of any other system, and encouraged the careful maintenance of these standards. See Proceedings 1872, pages 18 and 21; Proceedings 1879, pages 82 and 83; Proceedings 1882, page 229.

A set of gages for standard screw threads and a standard inch scale, 2 feet long, are held in the office of the Secretary for reference.



Mr. Sellers, who proposed this system of screw threads, described it in an essay before the Franklin Institute of Philadelphia, April 21, 1864, as follows:

"The proportions for the proposed thread and its comparative relation to the sharp and rounded threads will be readily understood from the diagrams, FIGS. 11-16. The angle of the proposed thread is fixed at 60 degrees, the same as the sharp thread, it being more readily obtained than 55 degrees, and more in accordance with the general practice in this country. Divide the pitch, or, which is the same thing, the side of the thread into eight equal parts, take off one part from the top and fill in one part in the bottom of the thread, then the flat top and bottom will equal one-eighth of the pitch; the wearing surface will be three-quarters of the pitch, and the diameter of screw at bottom of the thread will be expressed by the formula:

$$\text{Diameter,} \quad \frac{1.299}{\text{Number of threads per inch.}}$$

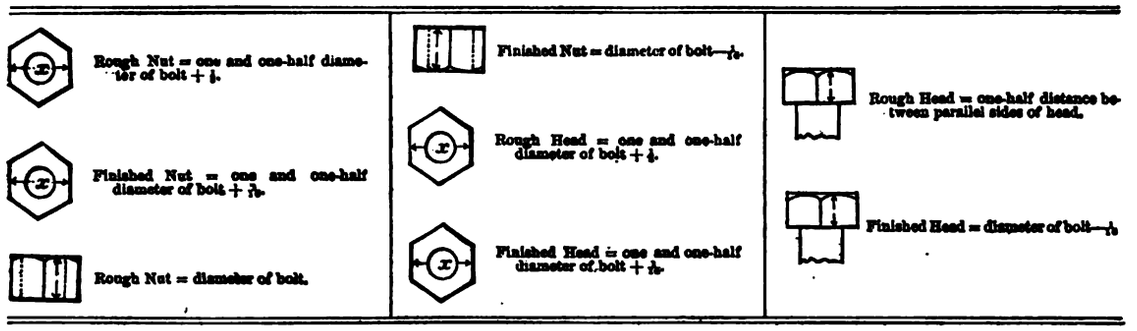
The tables are reprinted from Mr. Sellers' essay; they give the proportions of his standard screw threads, nuts and bolt heads.

The Sellers or Franklin Institute System is also called the United States Standard System.

PROPORTIONS FOR SELLERS' STANDARD SCREW-THREADS, NUTS AND BOLTS.

Screw-Threads.				Nuts.				Bolt Heads.			
Diameter of screw.	Threads per inch.	Diameter at root of thread.	Width of flat.	Short diameter rough.	Short diameter finish.	Thickness rough.	Thickness finish.	Short diameter rough.	Short diameter finish.	Thickness rough.	Thickness finish.
1/4	20	.185	.0062	1/2	7/16	1/4	1/4	1/2	7/16	1/4	1/4
5/16	18	.240	.0074	17/32	17/32	5/16	1/4	17/32	17/32	17/32	1/4
3/8	16	.294	.0078	11/16	5/8	3/8	5/16	11/16	5/8	11/16	5/16
7/16	14	.344	.0089	25/32	25/32	7/16	3/8	25/32	25/32	25/32	3/8
1/2	13	.400	.0096	7/8	13/16	1/2	7/16	7/8	13/16	7/16	7/16
9/16	12	.454	.0104	31/32	31/32	9/16	1/2	31/32	31/32	31/32	1/2
5/8	11	.507	.0113	1 1/16	1	5/8	9/16	1 1/16	1	1 1/32	9/16
3/4	10	.620	.0125	1 1/4	1 1/16	3/4	11/16	1 1/4	1 1/16	3/4	11/16
7/8	9	.731	.0138	1 7/16	1 1/4	7/8	13/16	1 7/16	1 1/4	13/16	13/16
1	8	.837	.0156	1 5/8	1 7/16	1	15/16	1 5/8	1 7/16	15/16	15/16
1 1/8	7	.940	.0178	1 13/16	1 5/8	1 1/8	1 1/16	1 13/16	1 5/8	15/16	1 1/16
1 1/4	7	1.065	.0178	2	1 13/16	1 1/4	1 1/16	2	1 13/16	1	1 1/16
1 3/8	6	1.160	.0208	2 1/16	2 1/8	1 3/8	1 1/16	2 1/16	2 1/8	1 1/16	1 1/16
1 1/2	6	1.284	.0208	2 3/16	2 3/16	1 1/2	1 1/16	2 3/16	2 3/16	1 1/16	1 1/16
1 5/8	5 1/2	1.389	.0227	2 5/16	2 1/4	1 5/8	1 1/16	2 5/16	2 1/4	1 1/16	1 1/16
1 3/4	5	1.491	.0250	2 1/2	2 7/16	1 3/4	1 1/16	2 1/2	2 7/16	1 3/4	1 1/16
1 7/8	5	1.616	.0250	2 11/16	2 5/8	1 7/8	1 1/16	2 11/16	2 5/8	1 13/16	1 1/16
2	4 1/2	1.712	.0277	2 7/8	2 13/16	2	1 1/16	2 7/8	2 13/16	1 15/16	1 1/16

PROPORTIONS FOR SELLERS' STANDARD NUTS AND BOLTS.


Rough Nut = one and one-half diameter of bolt + ⅛.
Finished Nut = one and one-half diameter of bolt + ⅛.
Rough Nut = diameter of bolt.
Finished Nut = diameter of bolt—⅛.
Rough Head = one and one-half diameter of bolt + ⅛.
Finished Head = one and one-half diameter of bolt + ⅛.
Rough Head = one-half distance between parallel sides of head.
Finished Head = diameter of bolt—⅛

NOTE.—In 1899 the following dimensions for square bolt heads were adopted as recommended practice: The side of the head shall be one and one-half times the diameter of the bolt, and the thickness of the head shall be one-half the side of the head. See page 39, Recommended Practice. In 1900 these dimensions were adopted as standard.

SCREW THREAD GAGE. A steel plate with notches in the edge of the precise form of screw threads, used for giving the proper form to the edges of screw cutting tools. See, SELLERS' SCREW THREAD and SCREW THREADS.

SCREW TOP (Bell Cord Hangers). FIGS. 1859-60. A simple form of BELL CORD HANGER BRACKET, which see.

SCRIBING. The fitting of the edge of a piece of timber or metal to another more or less irregular surface. Scribing is usually done by marking a parallel line to the surface which it is designed to fit by a pair of compasses or with a scribe awl.

SCROLL IRON (English). A wrought iron forging, carrying a vertical spring link adjusting screw. The upper face is attached to the under side of the sole bar, and the lower part is bored horizontally for the adjusting screw. In general use on passenger service.

SCRUBBER AND CONDENSER. (Adlake System). FIG. 2656.

SCUTCHEON (of a Lock). Properly, ESCUTCHEON, which see.

SEALS. FIGS. 3120-41. See, CAR SEALS. See also, LEAD SEAL. LOCK SEAL. RIVET SEAL.

SEAL LOCK (Freight Car). FIGS. 3120-41. A lock in which a seal made of glass, paper, or other material is inserted in the lock in such a manner as to cover the bolt or the key hole. The lock cannot be opened without breaking the seal. See, CAR SEAL.

SEAL PRESS. FIGS. 3126-27. A pair of levers arranged like a pair of pincers, with two dies in which lead car seals are compressed on the wire to which they are attached, leaving an impression on the lead so that if the seals are removed or defaced it can be known. Similar seal presses are used for eyelet shackles.

SEAL WIRES. FIGS. 3122, etc. Several strands of fine wire twisted together like a rope, or single bars of twisted flat wire, by which leaden seals are attached to car doors. There are various special forms, called detective wires, as FIGS. 3133, etc., to prevent stripping the seal.

SEAL WIRE OPENING (Car Door Fastener). A hole for inserting the shackle of a seal.

SEALED JET ACCELERATOR. (Gold's Car Heating). FIG. 2388. The essential part of the apparatus shown in FIG. 2327. Live steam is brought directly into contact with the circulating water and heats it, at the same time forcing the circulation.

SEAMING LACE (English). An ornamental woolen fabric made in bands about ½ inch wide, and used to cover the seams and joints in the upholstery of a carriage. It is sewn to any textile fabric and has two tape edges and is wrapped round a piece of seaming cord which is stitched inside. It differs from PASTING LACE, which see.

SEAT. 1. "That on which one sits."—Webster.

2. FIG. 3142. "The flat portion of a chair or sofa to support the person."—Knight. See, CAR SEAT, special forms, which also see, being:

CANE SEAT.
CORNER SEAT.
HALE AND KILBURN SEATS.
HEYWOOD BROS. & WAKEFIELD SEATS.
LONGITUDINAL SEAT.
PARLOR CAR CHAIRS.
PUSHOVER SEAT.
RATTAN SEAT.
RICHARDS PANEL BACK SEATS.
REVERSIBLE SEAT.
REVOLVING CHAIR.
SCARRITT-FORNEY SEATS.
SIDE SEAT.
SLAT SEAT.
SLIDEOVER SEAT.
WHEELER SEATS, etc.

See also, SALOON SEAT.

3. In Mechanics: "The part on which another thing rests, as a valve seat."—Knight. See,

AXLE SEAT.
BOLSTER SPRING SEAT.
DISCHARGE VALVE SEAT.
EQUALIZING BAR SEAT.
EQUALIZING BAR SPRING SEAT.
LEATHER SEAT.
RUBBER SEAT.
SPRING SEAT.
TANK VALVE SEAT.
WHEEL SEAT.

4. (For Hand Car.) 12, FIGS. 4722-27. A horizontal board placed lengthwise over the wheels above a rave for the occupants to sit on.

SEAT ARM. 9, FIGS. 3151-52; FIGS. 3339-43. An arm by which the back of a seat is attached to the seat end or to the side of the car. Such arms are usually attached by a pivot, so that the seat back can be reversed. Sometimes called striker arm, seat back arm, and also seat back reversing arms. Some of the various forms are the Forney, FIG. 3195, etc.; the Hale & Kilburn, FIGS. 3151-52, etc., and the Walkover (H. & K.'s), FIGS. 3153-56.

This term is also used to designate the portion of a seat end (more properly called seat end arm) which supports the arm of a person sitting in the seat, as 3, FIGS. 3151-52, and sometimes, incorrectly, to designate an ARM CAP, FIGS. 3260-64, which see.

SEAT ARM CAP. FIGS. 3260-64. A piece of metal shaped to the form of the seat arm and screwed to the top to take the wear and as an ornament.

SEAT ARM PIVOT. FIGS. 3318-3332. A metal pivot by which a seat arm of a reversible seat is attached to a seat end or the side of a car. In some cases the pivot is made in one piece with the seat arm plate, which is attached to the seat end. The two combined then become a SEAT ARM PIVOT PLATE, which see. A seat arm pivot is sometimes called in the trade a seat arm rivet.

SEAT ARM PIVOT PLATE. FIGS. 3318-19, 3324-32. See above.

SEAT ARM PLATE. FIG. 3316, etc. A plate fastened to a seat end with a hole in the center, which receives and holds a seat arm pivot. In some cases the pivot is made in one piece with the plate. The part formed by combining the two is then called a SEAT ARM PIVOT PLATE, which see, sometimes a seat arm pivot plate or washer and a bolt is used, FIG. 3280.

SEAT ARM REST BRACKET. FIGS. 3256-58. A bracket to be screwed to the wall to carry a wood arm rest.

SEAT ARM RIVETS. FIGS. 3281-86.

SEAT ARM STOP. FIGS. 3306-11, etc. A metal lug or bracket attached to a seat end, and sometimes to the side of the car, on which the seat arm rests. Seat stops are either attached to a long plate (curved or straight seat stop), as in FIGS. 3299-3305, etc., or as in round seat stops, FIGS. 3312-15, etc., and have a flange entirely surrounding them, by which they are attached to the seat arm or side of the car. They are also called seat stops.

SEAT ARM THIMBLES. FIGS. 3265-66.

SEAT ARM WASHER. FIGS. 3290-93. A small washer for the head of a screw, by which a seat arm is fastened to a seat end. Now little used.

SEAT BACK. 2, FIGS. 3151-52, 3169-91. That part of an ordinary American car seat which forms a support for the back. It has an arm, called the seat back arm, attached to it, by which it is attached to the seat ends with a seat arm pivot, so that it can be swung over so as to face the other way. In some styles the seat back arm is pivoted below the seat cushion and the seat back swings over the cushion so that both sides are used alternately. See, SEAT. On some suburban cars, and usually on street cars, longitudinal seats are used, with the backs against the side of the car. See, SLAT SEAT BACK. FLEXIBLE TOP SEAT BACK. SECTIONAL SEAT BACK.

SEAT BACK ARM. A SEAT ARM, which see.

SEAT BACK ARM LOCK. See, SEAT LOCK.

SEAT BACK ARM PIVOT. 1. Pivoted seat arm. FIG. 3343. The swinging joint or seat back pivot in the seat arm.

2. A SEAT ARM PIVOT, which see.

SEAT BACK BAND. FIGS. 3237-38, 3268-79. A SEAT BACK MOLDING, which see.

SEAT BACK BOARD (Street Cars). A board placed between the two seat back rails of a longitudinal seat. Usually made in the form of a raised panel so as to make a comfortable rest for the back. A seat back.

SEAT BACK BOTTOM RAIL. See, BACK SEAT BOTTOM RAIL. Also called a lower seat back rail.

SEAT BACK CORNERS. FIG. 3338. A metallic corner piece to screw to the backs of seats and protect the upholstery from wear.

SEAT BACK CURVED STOP. FIGS. 3301-05. A SEAT BACK STOP, which see, of a curved form, resembling somewhat a letter S.

SEAT BACK MOLDING. FIGS. 3268-79. A wood or (usually) metal band or molding fastened around the edge of a seat back to give it a finish and protect it from wear.

SEAT BACK PIVOT PLATE. 10, FIGS. 3151-52, 3169-91. The plate bearing a seat arm pivot fastened to the seat back.

SEAT BACK RAIL (Street Cars). Two narrow rails, upper and lower, which form the top and bottom of a longitudinal seat inclosing the seat back board between them.

SEAT BACK REVERSING ARMS. 9, FIGS. 3169-91. A seat back arm of a Scarritt-Forney seat.

SEAT BACK ROUND STOP. FIGS. 3312-15. A round SEAT STOP, which see.

SEAT BACK SLATS. FIG. 3145. Narrow strips of wood used to form a seat back; used chiefly for seats which are not upholstered.

SEAT BACK SPRING. A weak spring placed in the upholstering in the back of a seat. Usually called simply back spring.

SEAT BACK STOP. See, SEAT STOP.

SEAT BEARING CROSS BAR. (Longitudinal Seat of Street Car.) The bearing bar transverse to the seat and resting upon the seat leg and the back seat rail.

SEAT BOARD (English). In a carriage, the support for the seat sofa springs. These springs are tied down, and a piece of canvas is stretched tightly over them, the cushion resting on this canvas.

SEAT BOTTOM (Street Cars). The boards or floor in a seat frame on which a cushion rests, or on which persons sit when no cushion is used. It is attached to the back and front seat bottom rails.

SEAT BOTTOM CROSS BAR. A filling piece shaped like the seat bottom, to which the slats are screwed. It rests upon or over the seat bearing cross bar.

SEAT BOTTOM RAIL. See above.

SEAT BRACKET (Hand Car). 13, FIGS. 4722-27. A wrought iron knee which supports the seat.

SEAT BRACKET BRACE (Hand Car). 14, FIGS. 4722-27.

SEAT CORNER. FIG. 3338. A metal corner plate to protect the wood corner from abrasion.

SEAT COVE. The rail that takes the place of the back seat bottom slat.

SEAT COVER (Street Car). A piece of tapestry or seat covering with which the bare seat is often covered.

SEAT COVER GUARD RAIL. A strip of wood tacked to the flap of the seat cover to keep it straight.

SEAT CUSHION. 1. FIGS. 3151-52, 3169-91. A soft pad or pillow on which passengers sit. Two kinds of cushions are used on cars; a squab cushion, which is a loose pad and is now little used, and box cushion, which is a cushion built upon a cushion frame, with springs, etc. See, BACK SQUAB (English).

A great variety of forms of seat cushions exist, the leading ones of which are shown. Special forms, separately defined, are, as respects material, woven wire, rattan or cane, canvas lined; as respects mode of construction, flexible top, elliptic, broad band elliptic, spiral elliptic, spring edge, sectional, drop down frame, etc., etc.

2. (English.) American equivalent, squab cushion. In a first class carriage, a flat, loose squab cushion, about four inches thick, covered with broadcloth on one side and leather on the other, and stuffed with curled horse hair. It is reversible, and often so called.

SEAT DIVISION (Longitudinal Seats). Shown in FIG. 80. A bar of wood or metal to separate the space occupied by a passenger from that adjoining it.

SEAT END. 123, FIGS. 388-91; 3, FIGS. 3151-52, 3169-91, and 13, FIGS. 1778-83. A frame of wood or metal at the end of a car seat which supports the arm of the occupant and to which the seat back arm is attached. Seat ends are designated long or short, according to whether they extend entirely to the floor or are supported upon a seat stand. They are also designated as aisle seat ends, or wall seat ends, and, for corner seats, as left hand or right hand seat ends.

SEAT END ARM. 4, FIGS. 3151-52. The portion of a seat end which supports the arm of a person sitting in the seat. An arm rest.

SEAT END PANEL RIB (Open Street Car). A piece of furring to which the seat end panel of an open car is fastened.

SEAT END CROSS RAIL. 6, FIGS. 3151-52, 3169-91. The end rail between the posts of a wood seat end.

SEAT END REST. 5, FIGS. 3151-52, 3169-91. The end posts or upright members of a wood seat frame.

SEAT FRAME. 12, FIGS. 3169-91, 3151-52.

SEAT FRONT (Street Car). The ravé or seat riser.

SEAT FRONT PANEL (Street Car). The panel beneath the seat, the same as a rest front.

SEAT FRONT RAIL. A rail fastened to the ends of the seat bearing cross bar and running along at the top of the seat front and under the front seat rail.

SEAT HEAD END. 14, FIGS. 1778-83. The upper part of the seat end projecting out beyond the head rest.

SEAT HINGE (Sleeping Cars). FIGS. 3359-60. A strap hinge used to connect a seat with the seat back. See also, SOFA HINGE.

SEATING. FIG. 3234, etc. See, CANVAS LINED RATTAN SEATING. The plush which is commonly used to upholster car seats is also sometimes called seating.

SEAT JOINT BOLT. FIG. 3280. A bolt for fastening a seat rail to aisle seat ends. It is also used at the wall ends.

SEAT LEG (Longitudinal Seats). A wooden post which supports a front seat rail.

SEAT LEG PLATE. A metal plate with which the front of a seat end or leg is covered to protect it from injury.

SEAT LEVER (Howard's Water Closet). FIGS. 3089-90. A lever projecting backward from the seat lid, to which the connecting rod is attached.

SEAT LID (Howard's Water Closet). FIGS. 3089-90. A lid connected with the pan and service measure by the connecting rod in such a manner that on raising it the pan is brought up into position and about half a gallon of water is discharged from the service measure.

SEAT LOCK. FIG. 3259. A lock for holding the back of a seat so that its position cannot be reversed. Such locks are attached either to the seat end, seat back arm or seat back stop. A form for iron seat ends with a smaller escutcheon, not provided with screw holes, is sometimes distinctively called a barrel lock, although the term is almost equally applicable to any form of seat lock. Seat locks operate by pushing the key inward, turning it a little and then pulling on the key.

SEAT LOCK BOLT. FIGS. 3294-95. The beveled bolt by which locking is effected.

SEAT LOCK KEY. A key for a seat lock. Some work by pushing in and not turning. See, SEAT LOCK.

SEAT LOCK SPRING. FIG. 3294. The spring which moves the bolt.

SEAT PULL (Sleeping Cars). FIGS. 3354-55. A flush handle for pulling out the seat in making up the berth so as to drop the back and seat to the same level.

SEAT RAIL. 48, FIGS. 3169-91. One of a pair of wooden rails, front and back resting on and attached to the seat end and to the side of the car, and which supports a cushion frame or seat bottom.

SEAT RAIL BRACKET. A support for a wooden seat rail. In iron seat ends it is frequently cast upon it.

SEAT RAIL KNEE (English). A piece of wood secured to the door pillar and supporting the seat rail. It is generally slotted to receive a leather strap, restraining the undue opening of the door.

SEAT RAIL SUPPORT (English). A piece of hard wood supporting the seat and securing it to the side of the body of a carriage. It is often pierced for a leather strap limiting the opening of the door.

SEAT RISER. 1. (Street Cars.) A vertical board or front of a seat, extending from the seat rail to the floor; seldom used with reversible seats. A seat front.

2. (Hand Car.) 15, FIGS. 4722-27. A RAVE, which see.

SEAT SLAT. 13, FIGS. 3169-91. A narrow strip of wood which forms part of a seat bottotm, or seat back.

SEAT SPRING. FIGS. 3226-55. A spiral or other metal spring used to give a seat elasticity. Spiral springs are the most common, the elliptic and spiral-elliptic having become nearly obsolete in new seats. A special form of seat springs called back springs, of little resistance, is used for seat backs. English seat springs are called sofa springs, and the back springs back squab sofa springs.

SEAT STAND. 124 FIGS. 388-9; 7, FIGS. 3169-91. A support, usually made of cast iron, on which an aisle seat end rests. Very commonly the seat stand and seat end are in one part, which is then called a long seat end.

SEAT STAND TIE ROD. 25, FIGS. 3169-91. A rod connecting the aisle and wall seat stands of a Scarritt-Forney seat.

SEAT STOP. See, SEAT ARM STOP.

SEAT TILTING LEVERS. 35, FIGS. 3151-52. See, PARALLEL ROD.

SEAT WEBBING. FIGS. 3226, etc. A form of coarse canvas used in upholstering car seats.

SECOND CATCH (of Car Door Fastener). A double hook or eye placed in the hasp of a car door lock in such manner that the door can, if desired, be locked, leaving a crack open for ventilation.

SECOND CLASS CAR. A plainly finished passenger car for carrying passengers who pay a lower rate of fare than first class passengers do. Such cars are rarely used, the smoking car usually serving this purpose for the small number of so-called second class (in reality, third class) passengers. See, COACH. FIRST CLASS CAR.

SECOND CLASS CARRIAGE (English). A vehicle adapted to carry passengers paying an intermediate rate of fare, the fittings being less expensive and comfortable than in the first class. Each compartment measures about 6 feet in the length of the carriage, and seats 10 passengers. It is rapidly going out of use, so much so that several of the English roads have discontinued the running of second class carriages. See also, CARRIAGE.

SECTION. 1. See, SECTIONAL SEAT CUSHION.

2. (Of a Sleeping Car.) FIGS. 1778-80. Two double berths, one above the other, making up into two seats facing each other by day. There are from 8 to 16 sections in a car, besides the state rooms.

SECTIONAL SEAT CUSHION. One with spiral springs separately attached to narrow slats so that the seat can be made up or repaired in sections.

SECTOR. In geometry: "A part of a circle included by an arc and the two radii drawn to its extremities."—Davies. Hence, any object whose shape is that of a part of a circle ought to be called a sector, but as a matter of fact, it is generally called a quadrant. See, DECK SASH QUADRANT.

SECURITY CAR DOOR. FIGS. 1062-64.

SECURITY DOOR BRACKETS. FIGS. 1050-51. A door bracket designed to prevent the opening of the door from the side or bottom without destroying the seal. They are bolted to the car body, and the bolt head is fitted into a socket in the bracket.

SELF ACTING VENTILATOR. An AUTOMATIC VENTILATOR, which see.

SELF CLOSING FAUCET, OR COCK. FIG. 2766. A faucet having a horizontal bar handle provided with a spring by which it is closed when released. TELEGRAPH COCKS, which see, FIGS. 2763-64, and also compression cocks, FIG. 2769, are also self closing, but not distinctively so called.

SELF LOCKING OR SPRING PADLOCK. One which snaps, locked by pressure only, without using a key, in distinction from a dead padlock.

SELLERS SYSTEM OF SCREW THREADS. A system of screw threads designed by William Sellers of Philadelphia. Often called Franklin Institute or United States Standard Thread. See, SCREW THREAD.

SEMAPHORE LENS. A trade name for a cheap modification of the Fresnel lens, the latter term being more generally restricted to those having the back a plane or nearly cylindrical surface.

SEMI-CONVERTIBLE CAR. FIGS. 4732, 4735, 4748-49, 4762-64. A modification of the convertible car in which only the sash raises into the roof, leaving the car open above the belt rail.

SERVICE MEASURE (Howard's Water Closet). FIGS. 3089-90. An auxiliary tank holding about a half-gallon of water connected with the seat lid and water tank and discharging the water on raising the lid only.

SESSIONS STANDARD FRICTION DRAFT GEAR. FIGS. 1157-84. A form of friction draft gear in which the friction surfaces are triangular wedges forced together with gradually increasing pressure as they slide over each other. In one type, FIGS. 1157-74, the springs are set at right angles to the line of draft, and are compressed by the displacement of the wedge cap or front follower which rubs on the wedges placed inside the yoke.

SET (of Elliptic Springs). The amount of compression of which the spring is capable. The distance between the spring bands when unloaded. The arch is half the set, plus the thickness of the spring band.

SET OF SPRINGS. All the springs for carrying the weight of one car, not including draw springs. A set of bolster springs consists of the springs which are placed between the truck frames and carry the weight of the body only. A set of equalizing bar springs means all the springs for a car on the equalizing bars. A set of wheel or journal springs means all the springs which are placed directly over the journal boxes of one car.

SET OF WHEELS. This term means a number of wheels sufficient for one car. A set of wheels and axles means the requisite number of wheels fitted to axles complete for one car. A pair of wheels means two wheels already fitted to an axle, including the axle; but a set of wheels does not include the axles unless specified.

SET SCREW, OR STUD FASTENING. FIG. 4233. As applied to railroad wheels, a mode of securing the tire to the wheel which is becoming obsolete. See, TIRE FASTENING.

SEWALL STEAM COUPLING. FIGS. 2315-18. This is a straight port, abutting face, and insulated steam coupler. The cut shows its construction. The passage for steam is unobstructed. On the coupler head are a tooth and space in such a position as to serve the double purpose of a guide for the interlocking devices when being coupled, and also retain the coupler heads in proper relation while uncoupling. The locking features are constructed upon epicycloidal curves, thereby drawing the gaskets together in a direct line after contact. The center line of pressure exactly coincides with the centre line through the locking devices, and hence gravity tightens the gasket faces. The coupler is automatic in uncoupling in consequence of the curvature of the hose nipple, the center line of draft being brought above the center line of pressure as soon as hose begins to approach a horizontal position. The gaskets are of rubber.

SEXTUPLE (Elliptic Springs). Six elliptic springs coupled together, side by side, to act as one.

SHACKLE. 1. (Of a Padlock.) A U-shaped bar which is passed through the staple in front of the hasp by which the padlock is used to lock the object. The inner end of the shackle is termed the heel, which is sometimes provided with the shackle spring to hold the shackle open or shut.

The shackle of cheap padlocks is attached to projecting ears, but in those of better quality the heel is entirely within the lock itself. The shackle is sometimes termed the hasp, but this usage is incorrect.

2. (Of Car Seals.) The wire or metal strip passing through the fastening to be sealed and closed together at the end. See, CAR SEALS.

SHACKLE BAR. A COUPLING LINK, which see.

SHACKLE GUARD (of a Padlock). A plate used in some padlocks lying immediately under the point of the shackle when locked in place, serving to exclude dirt and wet from the interior.

SHACKLE LOCK (Car Door Fastener). A term used in distinction from the seal lock.

SHADE. See, LAMP SHADE. WINDOW SHADE. FIGS. 3708-28.

SHADE CAP (of a Lamp). 33, FIGS. 2694-2710. A vertical tube extending the shade upward and constituting in effect an extension of the chimney. A similar part for a lamp globe is called a globe chimney.

SHADE HOLDER (Pintsch Lamp). 483, FIGS. 2605-21.

SHADE ROLLER (for Window Shades). FIG. 3724. A device serving the purpose which its name implies, the only forms of which now in general use are the automatic forms, which hold the shade in any position when released by means of centrifugal pawls. The leading styles are the Hartshorn Shade Roller and the McKay Shade Roller, which see. The Hartshorn works with a pawl on the end, while the McKay has a cam. See BURROWES CAR SHADES.

SHAFT. "That part of a machine to which motion is communicated by torsion."—Webster. See

BRAKE SHAFT.
CRANK SHAFT.
DOOR SHAFT.
DRIVING SHAFT.
DRUM SHAFT.
HORIZONTAL BRAKE SHAFT.
LEVER SHAFT (Street Cars).
WINDING SHAFT.

SHAKER. FIG. 2194, etc. See, GRATE SHAKER.

SHANK. (Of a Coupler.) That part of a coupler or drawbar between the draw head and tail end. The body of the coupler. It may be round, square and corrugated in different couplers.

SHANK (Kirby's Car Door Lock). A, FIG. 1980. The spindle. See also, BUFFER SHANK. LOCK SHANK.

SHANK FACING (Kirby's Car Door Lock). P, FIG. 1980.

SHARP JOURNAL BOX. FIGS. 4102-06.

SHEAR BEAMS. (Snow Plow Framing.) The timbers forming the inclined plane and parting ridge of a plow. They are placed in positions so that they resemble the knives of a pair of shears, hence the name.

SHEARS (of a Pile Driver Car). The tongs which grasp the HAMMER, which see.

SHEATHING. 52, FIGS. 159-69 and F; FIGS. 185-95, also 70; FIGS. 388-91. Boards which are tongued and grooved, and with which the sides of cars are covered. The sides of a gondola car are ordinarily termed side plank and end plank, and are much heavier than the sheathing of a box car. INSIDE LINING, which see, is in addition to the ordinary outside sheathing. Formerly passenger cars were covered with panels, but it is now the universal practice to use sheathing.

SHEATHING FURRING. 59, FIGS. 385-87. Pieces of wood nailed, screwed or glued in a wall to nail the sheathing to, inserted where the distance between rails is so great as to require intermediate pieces to back up the sheathing. Corresponds to PANEL FURRING, which see.

SHEATHING RAIL. 66, FIGS. 360-72, 385-87, 388-91. See, PANEL FURRING. A sheathing rail, or sheathing furring, is the same as a panel rail or a panel furring, the paneling having been superseded by sheathing.

SHEATHING STRIPS. 69, FIGS. 360-72. See, PANEL STRIPS.

SHEAVE. A wheel, roller or pulley, over which a cord or rope runs, or on which any object, as a door or window, rolls. Sheave is often used to designate a block or pulley, but more properly it designates simply the grooved wheel in the block. See, PULLEY.

SHEAVE HOOK (Derrick Cars). The hook carried at the lower end of a hoisting block, to which the load is attached.

SHEAVE PIN, OR PINTLE. The axle of a sheave. See, PINTLE.

SHEET IRON. Iron rolled thin and, in car work, usually galvanized. Its thickness is given by its number of WIRE GAGE, which see. The standard sizes are 6 and 8 ft. long and 24, 26, 28 and 30 in. wide. It is, however, manufactured to order up to 10 ft. long and 44 in. wide. Sheet steel, galvanized or not, is now also largely manufactured.

SHEET RING AND STAPLE (English). A small wrought iron ring, to which are tied the cords attached to the edges of the tarpaulin protecting the contents of an open wagon from the rain.

SHEFFIELD HAND CAR. FIGS. 4716-18, etc. A name applied to several varieties of hand cars, taken from the name of the designer, but more particularly applied, first, to an ordinary section hand car with wooden wheels, and, secondly, to a three wheel hand car for inspection purposes.

SHELL. See, BERTH LATCH SHELL.

SHELLED OUT (Car Wheels). A term applied to wheels which become rough from circular pieces shelling out of the tread, leaving a rounded flat spot, deepest at the edge, with a raised center. The M. C. B. rules for INTERCHANGE OF TRAFFIC, which see, specify that no wheel

shall be condemned for this fault unless the spots are over 2½ in. in length, or are so numerous as to endanger the safety of the wheel.

SHIELD (Buhoup Vestibule). 50, FIGS. 1526-1630.

SHIELD (Pintsch Lamp). 293, FIGS. 2605-21.

SHIM. A thin piece of wood or metal used as a distance block to save more careful fitting. In track work shims are very largely used in order to remedy the heaving of the rails from frost. Shimming has been used in fitting on car wheels when the wheel seat of the axle was a little too small, but the M. C. B. rules for interchange of traffic forbid this. See, INTERCHANGE OF TRAFFIC and WHEELS.

SHIPPER SHAFT (Steam Shovel). 7, FIGS. 357-9. The shaft connected to the boom engine and geared to the ratchet beam.

SHIP SPLICE. One of the many forms of splicing or scarfing broken pieces of timber. It is that selected for splicing broken car sills under the regulations for INTERCHANGE OF TRAFFIC, which see. See, SCARF.

SHOE. A plate, block or piece of any material on or against which an object moves, usually to prevent the latter from being worn. See, BOOM SHOE. BRAKE SHOE. DOOR SHOE.

SHORT SEAT END. A seat which does not extend below the seat or support it, but is supported upon a separate seat stand. See, SEAT END.

SHORT PLATE ROD. Horizontal bolts passing through the plate bolt strip and the plate, serving to stiffen the latter horizontally. It is rarely used.

SHORT SILL, OR FLOOR TIMBER. An auxiliary longitudinal timber used in a car floor, but not extending its whole length.

The term short floor timber is also applied with questionble propriety to short auxiliary cross pieces used in freight car floors as distance blocks between the sills and not extending across the whole width of the floor. Corresponding timbers in passenger cars are termed floor timber distance blocks. See also BRIDGING.

SHOT (Chilled Car Wheels). See COLD SHOT.

SHOVEL. 1. (Steam Shovel.) FIGS. 148-54, 357-59. A car upon which is mounted a steam derrick frame so adjusted and connected with proper mechanism that it will scoop up bucketfuls of dirt and gravel and deposit them in a car or other conveyor.

2. (Snow Shovel.) See SNOW PLOW.

SHUNTING (English). The act of moving cars from one track to another, as in making up or separating trains. In this country usually called switching. MARSHALING, which see, has a nearly similar meaning. Sometimes the word drilling or regulating is used.

SIAMESE FITTING. (Duplex Pump Governor.) 46, FIGS. 947-50 and 28, FIG. 963.

SIDE. See, DECK SIDE. LADDER SIDE. TRUCK SIDE.

SIDE ARM REST, OR ELBOW REST (English). A wooden support for the elbow attached to the inner sides of a carriage beneath the windows, and padded with horsehair and covered with broadcloth or leather. See also FOLDING ARM REST. In American cars a window ledge is made to serve the same purpose, but arm rests are general in sleeping cars.

SIDE BEARINGS. Supports placed on each side of the center pin of a car to prevent too much rolling or rocking motion of the car body. Usually there is a plate of iron or steel attached to the body bolster on each side of the center pin, called a body side bearing, 16, FIGS. 159-69, etc; 14, FIGS. 360-72—and a corresponding plate, block or roller on the truck bolster, called the TRUCK SIDE BEARING, which see, 61, FIGS. 3735-3951. They are also distinguished as lower and upper side bearings. Generally there is a little space left between the bearings, so that the truck can turn freely on the center plate, although in some cases the weight of the car body rests on the side bearings instead of the center plates.

SIDE BEARING BLOCK. FIGS. 3978-80. A filling casting bolted to the truck bolster and forming an abutment for the truck side bearing bar.

SIDE BEARING BRIDGE OR ARCH BAR (Six Wheeled Truck). 62, FIGS. 3948-51 and FIGS. 4040-41. An iron bar, truss or wooden beam attached to the spring beam to support the truck side bearing.

SIDE BEARING ROLLER. See, ROLLER SIDE BEARING.

SIDE BEARING SPRING (Side Dump or Tip Car). Bearing springs, upon which the body bears at the side to steady the box and to receive the shock when the body is returned to its normal position after dumping.

SIDE BEARING TIMBERS. Longitudinal or transverse floor timbers framed or bolted to the side posts of a coal or ore car, which support the upper ends of the inclined floor planking.

SIDE BOARD. 1. (Dining Cars.) An ornamental receptacle for dishes, etc., usually placed so as to face the central compartment of the car. See, BUFFET CAR.

2. (English). American equivalent, side plank. A planking constituting the sides of the car.

SIDE BODY BRACE. 33, FIGS. 159-69, etc. Commonly, simply BODY BRACE OR BRACE, which see, except when the end braces are to be distinguished from them.

SIDE BODY BRACE ROD. 34, FIGS. 159-69. See above.

SIDE BODY TRUSS RODS. See, SIDE TRUSS ROD.

SIDE BUFFER SPRING. See, BUFFER SPRING.

SIDE BUFFER STEM. See, SIDE STEM.

SIDE CAP (Triple Valve). 127, FIGS. 959-62.

SIDE CASTING. See, DRAWBAR SIDE CASTING.

SIDE CHUTE PLANK. 27b, FIGS. 271-95. The planking of an inclined floor which discharges its load transversely to the car, either toward or from the middle of the car.

SIDE DECK LAMP. A bracket lamp fastened above the windows and to the deck sill, or to the lower deck ceiling and the deck post.

SIDE DOORS. 1. (Baggage Car.) FIGS. 1035-37.

SIDE DUMP CAR. FIGS. 30, 318-24. A car so constructed that its contents may be discharged to one side of the track through side doors, either by having the floor inclined or by tipping it sidewise. See, DUMP CAR and TIP CAR.

SIDE FOOT REST (Passenger Cars). Q, FIG. 1781. A metal plate fastened to the truss plank between the seats for passengers to rest their feet on. Chiefly used over heater pipes as a guard to prevent the feet of passengers from coming in contact with the hot pipes. Also called shields.

SIDE FRAME. 1. (Of a Car Body.) The frame which forms the whole side of a car body. It includes the posts, braces, plate, rail, girth, etc. See, FRAMING.

2. (Of a Truck.) See, TRUCK SIDE FRAME. DIAMOND TRUCK.

SIDE GUTTER OR OUTSIDE CORNICE (English). A piece of wood secured on the outside of the vehicle at the angle of the roof to the sides. It is channeled on the top to catch the rain and to convey it to the ends of the vehicle to prevent it running down the sides.

SIDE GUTTER MOULDING (English). A moulding which is attached to the outer side of the side gutter in order to hide the heads of the bolts by which it is secured.

SIDE LAMP. 1. FIGS. 2696-2701. A lamp attached to the side of a passenger car. In distinction from a center lamp, which hangs from the roof; they are usually made with brackets, by which they can be conveniently fastened.

2. (English.) American equivalent, side tail light. A colored signal lamp carried at the side of the last vehicle of a train. Two red side lamps and one red tail lamp are generally carried, arranged in the form of a triangle.

SIDE LAMP BRACES. 18, FIGS. 2694-2710. Diagonal bars attached to a side lamp and to the side of a car to steady the lamp.

SIDE LAMP BRACKET. 17, FIGS. 2694-2710. See, SIDE LAMP.

SIDE LAMP HOLDER. 16, FIGS. 2694-2710. A metal ring or bowl shaped receptacle usually attached to a bracket to hold a lamp.

SIDE LAMP IRON (English). American equivalent, tail light holder. A wrought iron lamp holder secured to the outer side of the body to carry the colored SIDE LAMP, which see. See also, SIGNAL LAMP.

SIDE PIECE (for Platform Hood). A thin block cut to the curve of the hood.

SIDE PLANK (Gondola Cars). 52, FIGS. 246-50, 271-95. The boards bolted to the stakes constituting the sides of the car. They vary in height according to its capacity and are 2½ to 3 ins. thick. Those at the end of the car are termed end planks, and are usually hinged at the bottom so as to drop down inwardly on to the floor of the car.

SIDE PLANK TIE ROD. A vertical rod passing through the side sill and side planking, and tying them together. A side plank tie strap fulfills the same office, but the planks are bolted or riveted to the plank, the end of the strap being forged round and threaded to take a nut.

SIDE PLANK TIE STRAP. See above.

SIDE PLATE. 46, FIGS. 159-69; 98, FIGS. 360-72. More properly, simply plate. The longitudinal stick on top of the posts of the car body. So called as distinguished from the end plate.

SIDE PLATE STIFFENING ANGLE (Steel Cars). 41, FIGS. 271-95. An angle iron riveted to the side plank or plate, and serving the same purpose as the stakes.

SIDE POST STRAP BOLT. A strap bolt joining the post to the side sill.

SIDE RAIL. A longitudinal timber extending along the top of a side frame of a coal or ore car. It rests upon posts and braces and connects with end rails, which go across the end of the car. It corresponds to the plate of a box car, but does not carry any rafters or carlines, as does a plate.

SIDE REST (Tip Car). A block of wood or metal, or a spring, on top of the frame on which the body rests when tipped.

SIDE SEAT. FIG. 3239. A longitudinal car seat, the back of which is against the side of a car. See, CAR SEAT.

SIDE SHEET ANGLE TIE (Steel Cars). 44, FIGS. 271-95. An angle secured to the top edge of the side sheets and running across the car, to prevent the sides from bulging. See, BENCH CAP.

SIDE SILLS OR OUTSIDE SILLS. 1, FIGS. 159-169, 185-195, 208-11, 215-22, 223-26, 246-50, 271-78, 287-95, 360-72, etc. The exterior SILLS, which see. Sometimes the outside sills only are referred to by the single word sill, but this use of the word is uncommon. The side sills are usually made deeper than the inside sills in flat and gondola cars, and in box and stock cars. When the side sills are deeper than the center and intermediate sills, bolsters, similar to FIGS. 773-76 and 780-82, are used. In passenger cars the side sill, and the end sill as well, are sometimes plated with steel or iron to give greater stiffness.

SIDE SILL FLITCH PLANK. The two wood parts which enclose the flitch plate and make up a composite side sill.

SIDE SLOPE (Hopper Car). 27b, FIGS. 271-95. That part of the floor which slopes from the side of the car to the hopper door. See, END SLOPE and HOPPER SLOPE.

SIDE SPRING (Miller Hook). A spiral spring actuating the Miller hook laterally. The M. C. B. coupler, from its peculiar movement of the knuckle or coupling hook in coupling, requires no side play.

SIDE STEM (Janney-Buhoup Platform). 998, FIGS. 1526-1613.

SIDE STEM BEVEL WASHER (Janney-Buhoup Platform). 608, FIGS. 1526-1613.

SIDE STEM BRACKET (Janney-Buhoup Platform). 594, FIGS. 1526-1613.

SIDE STEM LUG WASHER (Janney-Buhoup Platform). 607, FIGS. 1526-1613.

SIDE STEM PIVOT PIN (Janney-Buhoup Platform). 586, FIGS. 1526-1613.

SIDE STEM SPRING (Janney-Buhoup Platform). 602, FIGS. 1526-1613.

SIDE STEP (Street Cars). A ledge usually made of a wrought iron plate attached to the side of the platform. Also called foot board.

SIDE STRAPS (Gondola Cars). The straps to which the end plank and sometimes also the side plank are bolted. They are also called side plank tie straps.

SIDE STRUT FOR HOPPER FLOOR (Hopper Cars). 43, FIGS. 271-95. An inclined strut or support for the hopper floor between the bolster and the end of the car, fastened to the corner of the end sill. See, CENTER STRUT FOR HOPPER FLOOR.

SIDE TOP PANEL RAIL (English). A part of the body framing running horizontally in the upper part of the side of a carriage.

SIDE TRUSS ROD BEARINGS. The queen posts of the side truss rods.

SIDE TRUSS ROD BLOCK. A block of wood or cast iron inserted in the corner at the junction of the side and end planking to guide the side truss rod.

SIDE TRUSS ROD OR SIDE TRUSSING. A horizontal truss rod extending longitudinally along the sides and fastened to the end planks. Its office is to prevent the sides from bulging. Seldom used.

SIDE URINAL. FIG. 3113. A urinal to fit against the flat side of a room, in distinction from a corner urinal. The latter are almost universal in car work.

SIDE URINAL HANDLE. So called in distinction from a CORNER URINAL HANDLE, which see.

SIDING. 1. A side track.

2. See, SHEATHING.

SIDING, FLOORING AND ROOFING. (M. C. B. Standard.) In 1901 the following specifications were adopted as standard:

Flooring shall be of three kinds—square edged, dressed all over; ship-lapped, dressed all over; or tongued and grooved, dressed all over, in accordance with section shown in FIGS. 4428-32.

Siding, roofing and lining shall be of the section shown in FIGS. 4428-32, and the tongue and groove placed centrally, so that either side of the material can be used as a face side.

SIGNAL LAMP, OR SIGNAL LIGHT. FIGS. 2726-29. A name applied to lanterns of extra power and quality of several kinds, but usually meaning those provided with semaphore or bull's eye lenses, of which from one to four are used; whence the name single lens, double lens, etc. They are also called side tail lights, tail lights, operator's signal lights, etc.

SIGNAL PIPE STOP COCK (Train Signal Apparatus). FIG. 958. A cock placed at each end of every car for closing the signal pipe at the rear of the train.

SIGNAL RESERVOIR (Train Signal Apparatus). FIG. 958. A small auxiliary reservoir for operating the train signals carried on the locomotive and connected with the main reservoir through a reducing valve, for the purpose of reducing the pressure to about two atmospheres, which is all that is required for operating the signals.

SIGNAL STRAP (Street Cars). A BELL STRAP, which see.

SIGNAL BELL. 1. (Street Cars.) A saucer shaped bell attached to each platform. They are rung by a clapper, to which a strap is attached which extends from one platform to the other.

2. (Locomotives.) A similar bell to which the bell cord is attached.

SIGNAL BELL CORD. See, BELL CORD and BELL STRAP.

SIGNAL BRANCH PIPE. FIG. 958. A pipe leading from the train signal pipe to the car discharge valve.

SIGNAL BRANCH PIPE CUT OUT COCK. FIG. 958.

SIGNAL CAR DISCHARGE VALVE. FIG. 958. See, CAR DISCHARGE VALVE.

SIGNAL CORD. FIG. 958. See, BELL CORD.

SIGNAL HOSE. FIG. 958. See, HOSE.

SIGNAL HOSE COUPLING. FIG. 958. See, HOSE COUPLING.

SIGNAL LAMP BRACKET. 141, FIGS. 343-52. A bracket attached to the car body to hold the signal lamp.

SIGNAL LENS (Street Car). A lens in the clear story of colored glass, behind which a lamp is placed.

SIGNAL PIPE (Train Signal Apparatus). FIG. 958. A continuous pipe running from car to car through the train, substantially a duplicate of the brake pipe, but working with a much lower pressure of air. The signal pipe couplings are also substantially similar to brake hose couplings, FIGS. 936-40, but have a thicker lip, so that they cannot be misconnected with the brake pipe.

SIGNAL PIPE COUPLING (Train Signal Apparatus). See above.

SIGNAL VALVE (Train Signal Apparatus). FIGS. 958 and 985. A valve attached to the signal pipe on the engine, which, on the opening of the car discharge valve in any car, and the consequent reduction of pressure in the signal pipe, permits the air to escape to blow the signal whistle.

SIGNAL WHISTLE (Train Signal Apparatus). FIG. 958. See SIGNAL VALVE.

SILL. 1. "Properly, the basis or foundation of a thing; appropriately, a piece of timber on which a building rests. The lowest timber in any structure, as the sills of a house, of a bridge, of a loom, and the like.

2. "The timber or stone at the foot of a door; the threshold.

3. "The timber or stone on which a window frame stands, or the lowest piece in a window frame."—Webster.

4. (Car Building.) The main longitudinal timbers, usually six, but sometimes eight in number, which are connected together transversely by the end sills, body bolsters, and cross frame tie timbers. Sills are divided into side sills, intermediate sills, and center sills. A few cars, such as dump cars and tank cars, have but two sills, and others only four. For the splice for broken sills required by the regulations for the interchange of cars, see INTERCHANGE OF TRAFFIC. See also

DECK END SILL.	PLATFORM SILL.
DECK SILL.	PLATFORM SHORT SILL.
END SILL.	SHORT SILL.
PLATFORM END SILL.	SWINGING PLATFORM SILL.

5. The lower horizontal member of the frame surrounding a window or door. See DOOR SILL. WINDOW SILL.

SILLS. (M. C. B. Standards.) In 1899 the following finished sizes for sections of longitudinal car sills were adopted as standard of the Association:

For cars such as box, stock, flat, long gondolas, refrigerators, etc., 32 feet and over in length, but under 40 feet:

4" x8"	4" x9"	4" x10"	4½"x12"	5" x14"
4½"x8"	4½"x9"	4½"x10"	5" x12"	
5" x8"	5" x9"	5" x10"		

For cars 40 feet long and over, such as furniture and special long gondolas:

4½"x8"	4½"x9"	5" x10"	6" x12"	6" x14"
5" x8"	5" x9"	6" x10"		
	6" x9"			

It is believed that the above recommendations afford a sufficient range of sizes to cover all requirements of design; they are good merchantable sizes, and if used as suggested car repairs will be greatly expedited, as there will be less delay in getting special sizes of lumber, and requisitions for regular sizes can be filled more promptly, as lumbermen can saw in advance of orders, with a reasonable certainty of selling their stock.

SILL AND PLANK ROD. A rod passing through the sill and planking to tie them together securely. A side plank tie rod.

SILL AND PLATE ROD. 36, FIGS. 159-69, etc.; 54, FIGS. 360-372, etc. A vertical iron rod which passes through the sill and plate of a car body frame and ties the two together. A BRACE STRAINING ROD, which see, is a similar part for low passenger car trusses below the windows.

SILL AND PLATE ROD WASHER. FIGS. 574-5.

SILL KNEE IRON. 8, FIGS. 360-372, etc. An L-shaped or right angled iron casting or forging bolted into the inside corner of a car frame to strengthen it. FIGS. 737-8.

SILL SPLICE. See SHIP SPLICE, and INTERCHANGE OF TRAFFIC.

SILL STEP (Freight Cars). 30, FIGS. 159-69, 185-195, 271-95 etc., and FIGS. 542-4. A U-shaped iron attached to the sill of a car, below the ladder, as a step for getting to or from the ladder. In 1893 the M. C. B. Association recommended that "That two good substantial steps (sill steps), made of wrought iron, about ½x1½ in. section, be fastened, one to each side sill, next to the corner of the car to which the ladder is attached, on cars having ladders, and to diagonally opposite corners on all other cars. The steps to be not less than 12 inches long, measured horizontally between the sides, and the tread to be not less than 8 inches below the bottom of the sill. The side of the step next to the corner of the car to be as near to the end of the car as is practicable. Each side of the step to be fastened to the sill with two ½ in. bolts and nuts." In 1902 this recommended practice was adopted as standard. See, PROTECTION OF TRAINMEN.

SILL STEP STAY. A diagonal iron rod or bar attached to one of the sills and to a sill step to stiffen the latter. Not commonly required or used.

SILL STRAP BOLT. 220, FIGS. 159-69. A strap bolt, used to fasten the side and end sills together. When set into the sill is called a joint bolt.

SILL TIE ROD. 10, FIGS. 246-50, 271-95, etc.; 9, FIGS. 360-72, 388-91. A transverse tie rod in the floor of a car for holding the sills together.

SILL TIMBER KEY. FIGS. 529-30. A metal block let into a gained seat on the sills to relieve the sill bolts from shearing.

SIMONTON DROP DOOR. (Drop Bottom Cars.) FIGS. 762-63. A drop door mechanism in which two links are brought into a self locking position when the doors are closed. The usual winding shaft is employed with a sheave over which the links are wound.

SIMPLEX BOLSTER. FIGS. 803-05. A type of bolster both body and truck using flat iron plates for the top and bottom members, and a cast center filling piece. The ends are lapped over and riveted. In the truck bolster the top member is a channel, and a heavy malleable iron strut is used in the center.

SIMPLEX BRAKE BEAM. FIGS. 860-62, 868. A metal brake beam made of 5-in. I beam, not trussed.

SINGLE BOARD CAR ROOF (Freight Cars). FIGS. 1714-36. A roof, of which several varieties other than those shown exist, in which one layer of boards covered by some kind of sheet metal is used in place of double boards. All single board freight roofs use a sheet metal cover, either above or below the boards, but those only having sheet metal on top are commonly so called.

SINGLE GUARD (for Lanterns). According to the number of horizontal wires surrounding the globe, lanterns are designated as single, double or triple guard.

SINGLE LEVER BRAKE. A brake which has but one lever to a truck or four wheeled car, to apply to two brake beams. In some cases applied to but one of the trucks

of a car; in other cases, to both. An objection to this form of brake is that the pressure is not equal on each brake beam. To overcome this difficulty two levers are used, and the brake is then called a DOUBLE LEVER BRAKE, which see.

SINGLE PIPE STRAP. FIG. 2265. A pipe CLIP, which see.

SINGLE PLATE WHEEL. FIGS. 4221-24. A cast iron wheel, in which the hub and tire are united by only a single plate, which is strengthened usually by ribs, called brackets, or sometimes by corrugations. See, WHEEL. CAR WHEEL.

SINGLE SASH SPRING. See SASH SPRING.

SINGLE SCREW TURNBUCKLE. A TURNBUCKLE, which see, shaped like a link of a chain with a screw at one end and a swivel at the other.

SINGLE WINDOW BLIND. A blind which is made in one piece or section, and large enough for one window. They require a lower window, and hence are rarely used in the better grades of passenger cars unless FLEXIBLE, which see. See also WINDOW BLIND.

SINGLE WINDOW BLIND LIFT. See, WINDOW BLIND LIFT.

SINK (Dining Cars). A shallow metallic box to receive and carry off dirty water.

SIX WHEEL TRUCK. FIGS. 3947-51; details, FIGS. 3952-4056. Six wheel trucks are the standard for sleeping, parlor and dining cars. They are sometimes, though rarely, built of iron. See, TRUCK. CAR TRUCK.

SKELETON (Steel Tired Wheels). Another term for the WHEEL CENTER or CENTRAL FILLING PIECE, which see. The word skeleton is principally used when the wrought or cast wheel center consists of open bars.

SKEW BACK. 1. (Masonry.) The face on the edge of the abutment against which the arch proper abuts.

2. (Of a Truss.) A casting on the end of a truss or a trussed beam to which a truss rod is fastened. It is usually made in the form of a cap, and forms a bearing for the truss rod nuts.

3. (Car Building.) A TRUSS ROD WASHER, which see.

SLAB. 2, FIGS. 2798-2800. See WASH STAND SLAB.

SLACK ADJUSTER. FIGS. 885-888. A device for automatically taking up the slack in the foundation brake gear when normal piston travel is exceeded.

SLANTING TABLE LEG. One which abuts against a slanting table leg plate in the side of the car instead of standing vertically.

SLANTING TABLE LEG HOOK. FIG. 3472. See above.

SLAT. A narrow piece of board or timber, such as SEAT BACK SLATS. SEAT SLATS. WINDOW BLIND SLATS, which see.

SLAT CATTLE CAR. A STOCK CAR, which see.

SLAT SEAT. A seat composed of narrow strips of wood. These are usually placed longitudinally on the seats with a space between them.

SLATTED FLOOR. An open floor made of slats nailed to cross pieces with a space left between them so that air can circulate beneath and through between the slats.

SLEEPER. 1. The ties or cross timbers on which the rails of a tramway are laid and spiked.

2. A misnomer for a sleeping car, since it is the passengers who sleep and not the car.

SLEEPING CAR. FIGS. 95-105, 125-132. Framing, FIGS. 373-4. A car provided with sleeping berths or beds for the use of passengers at night, which make up by day into ordinary seats. The greater number of sleeping cars are operated by the Pullman Company, and are hence often referred to simply as Pullman cars. EMIGRANT SLEEPING CARS, or TOURIST SLEEPING CARS, FIGS. 110-111, which see, have recently been introduced, resembling ordinary sleeping cars, but without expensive upholstery.

The first sleeping car built in the United States was made in the shops of the Terre Haute, Alton & St. Louis Railroad by a mechanic named Woodruff. The coach provided seats for sixty passengers, which were convertible into flat berths. The patent was secured in 1856-7. The next sleepers were two of the same kind run on the New York Central Railroad. Webster Wagner, founder of the Wagner Palace Car Co., built and patented four sleepers for the New York Central Railroad in 1858. The modern palace sleeping car was introduced by George M. Pullman, who built his first car in 1859. Some of the early Pullman cars had sixteen wheels instead of twelve. The first Wagner palace car was built in 1867. Both Wagner and Pullman paid royalties to Woodruff. See,

SLEEPING CAR SECTION. UPPER BERTH.
LOWER BERTH. COMPARTMENT SLEEPING CAR.

SLEEPING CAR FURNISHINGS. FIGS. 3354-3478. See, CAR FURNISHINGS.

SLEEPING CAR SECTION. FIGS. 1778-80. The space in a sleeping car occupied by two double seats in daytime and by two berths or beds at night. There are usually 12 sections in a car, in addition to a stateroom, smoking compartment, etc.

SLEET CUTTER. FIGS. 4865-66. A special trolley wheel having corrugated contact surfaces, used in place of a standard wheel during sleet storms. The corrugated surface breaks through the ice on the trolley wire and maintains electrical contact between the wheel and wire.

SLEEVE. See, PISTON SLEEVE. STAKE SLEEVE.

SLEEVE. 1. (Of Car Door Lock.) The part connecting the knob to the shank.

SLEWING GEAR. 1. (Of Pile Driver Car.) The means for causing the swinging platform to revolve. It consists of a hand wheel and spur wheel, the latter engaging in the slewing rack fixed to the floor of the car.

SLEWING RACK (of Pile Driver Car). See above.

SLEWING RINGS (of a Derrick). Rings attached to the upper end of the boom for attaching a rope by which to move or steady it when loaded.

SLIDE BOTTOM GONDOLA. A gondola car with the center and intermediate sills separated and a slide door inserted between. The door is moved by a lever, winding shaft and chain.

SLIDE VALVE (Triple Valve). (1) 6, FIGS. 913; 3, FIGS. 910, and 38, FIGS. 959-62; 966. A D-valve, controlled in its motion by the piston, by means of which the air is admitted to, and exhausted from, the brake cylinder, applying and releasing the brake. See also, REVERSING VALVE.

(2) (Reducing Valve.) 8, FIG. 952.

SLIDE VALVE LEVER (Engineers' Valve). 118, FIGS. 968-71.

SLIDE VALVE SPRING (Triple Valve). 9, FIGS. 959-62, 966; 6, FIG. 910, and 18, FIG. 913.

(Reducing Valve). 9, FIG. 952.

SLIDING BOLT (of a Padlock). The bolt in the interior of the padlock which engages with the shackle, locking it to place. The forward end of the bolt is termed the bit. The movement of the sliding bolt is controlled by the sliding bolt spring.

SLIDING DOOR. A door opened by sliding sideways instead of swinging on hinges. Such doors are almost universally used on freight cars. They are hung by a hook called the door hanger, which slides on a top door track. See also, CAR DOOR HANGER. They are also in general use on baggage cars and street cars.

SLIDING DOOR BRACKET. A DOOR TRACK BRACKET, which see.

SLIDING DOOR FIXTURES. FIGS. 2153-66. See also, CAR DOOR HANGER, SLIDING DOOR LOCK AND LATCH.

SLIDING DOOR FRICTION ROLLER. FIGS. 2153-60. A small wheel attached to the top or bottom of a sliding door to make it run easily. It may or may not carry the weight of the door.

SLIDING DOOR HANDLES. FIGS. 1936, 1939-40. See, DOOR HANDLES.

SLIDING DOOR HASP AND STAPLE (Mail Car). FIGS. 1910-11. See, HASP and STAPLE.

SLIDING DOOR HOLDER OR HOOK (Street Cars). A metal hook by which a sliding door can be fastened on the inside.

SLIDING DOOR HOOK AND BUTTON (Baggage Car). FIGS. 1912-13.

SLIDING DOOR LATCH. FIGS. 1914-34. A latch made with a hook lifting vertically instead of a bolt sliding horizontally, for fastening sliding doors.

SLIDING DOOR LATCH KEEPER. FIGS. 1914, 1919-34, etc. Also called a strike plate.

SLIDING DOOR LOCK. FIGS. 1916, 1922-34. A lock made especially for fastening sliding doors. Such locks usually have a hook which engages in a corresponding catch attached to the door post. The hook is secured in connection with the catch by means of a bolt, which is operated by a key.

SLIDING DOOR ROLLER. FIGS. 2153-60.

SLIDING DOOR SHEAVE (Street Cars). See, DOOR SHEAVE.

SLIDING DOOR TRACK. See, DOOR TRACK.

SLIP LAMP BURNER. A burner in which the chimney is held in place by springs or screws, and so constructed that the entire slotted cap to the burner may be removed at once by lifting, still carrying the chimney, without removing any spring.

SLOPING CLOSET HOPPER. FIG. 3094. See, CLOSET HOPPER.

SMITH CAR DOOR. FIGS. 1053-54.

SMOKE BELL. FIGS. 2663-73, and 13, FIGS. 2694-2710. A cover or screen of glass, porcelain or metal, shaped somewhat like a bell, and placed over a lamp to protect the ceiling of a car or room. Large smoke bells are often called canopies.

SMOKE BELL (Pintsch Lamp). 1140, FIGS. 2605-21.

SMOKE BELL BRACKET. A separate carrier for a smoke bell.

SMOKE BELL CEILING PLATE (Pintsch Lamp). 1141, FIGS. 2605-21.

SMOKE BELL STEM (of Lamps). A tube attached to the upper part of a smoke bell and serving to conduct away the gases so as to bring the smoke bell lower and nearer to the lamp.

SMOKE FLUE. A smoke pipe.

SMOKE FLUE BASE (Baker Heater). FIG. 2199.

SMOKE JACK. See LAMP JACK. STOVE PIPE JACK.

SMOKE PIPE (Heaters). The pipe by which the smoke is conducted to the outside of the car, usually called stove pipe, but the stove pipe of heaters is called a smoke pipe or smoke flue, to distinguish it from the air pipes.

SMOKE PIPE CAP. A covering on top of the smoke pipe to exclude rain and wind. Also called jack.

SMOKE PIPE CASING (Heaters). An outside pipe which incloses a smoke pipe, leaving a space between the two through which air is admitted from the top and is thus warmed. See also PERFORATED SMOKE PIPE CASING.

SMOKE SCREEN (Baker Heaters). FIG. 2192, etc. A conical shaped box, the front of which is the feed door and the bottom of which is the hole through which the coal enters the fire pot, and which is covered by the safety plate.

SMOKE TOP (Baker Heater). FIG. 2199, etc. The upper part of the heater, made of Russia iron, in a conical form.

SMOKING CAR. A car usually attached to all passenger trains immediately behind the baggage car, in which smoking is permitted; also, in general custom, the only one open to passengers with second class tickets. BUFFET SMOKING CARS, which see, and some others, are more luxurious. COMBINATION SMOKING AND BAGGAGE CARS, which see, are also largely in use.

SMOKING CARRIAGE (English). A passenger vehicle in which smoking is allowed. The whole of a vehicle is seldom devoted to this purpose, separate compartments of each class being set apart for smoking in every train. as required by law. See also CARRIAGE.

SMOKING CHAIR (Parlor Cars). A chair distinguished from other parlor car chairs chiefly in being less roomy and comfortable.

SMOKING COMPARTMENT FURNISHINGS. FIGS. 3453-62.

SMOKING ROOM (Sleeping Cars). A compartment now almost universal in modern sleeping cars and parlor cars. It is generally kept for the free use of the passengers, and separate seats or berths are not sold in it.

SMOKING ROOM FURNISHINGS. FIGS. 3453-62.

SMUDGE (English). The scrapings and cleanings of paint pots collected and used to cover the outer side of the roof boards as a bed for the ROOFING CANVAS, which see.

SNATCH BLOCK. Properly a single block which has an opening (notch) in one cheek to receive the rope. The snatch block is usually provided with a swivel hook. The term is also popularly applied to any form of single block provided with a hook, although more properly it applies to only one with an opening at the side for readily inserting or removing the rope.

SNOW PLOW. FIGS. 145-47. "A machine operated like a plow, but on a larger scale, for clearing away the snow from railroads."—Webster. The parts of a snow plow corresponding with the plow share and mold board of an ordinary plow are mounted on running gear similar to that used for freight cars. Small snow plows are also attached to the cow catchers of locomotives and regularly carried throughout the winter. See RUSSELL SNOW PLOW.

Other machines, called the rotary steam shovel, and the Jull centrifugal snow excavator, operated in a manner altogether different from ordinary snow plows, are made and are in use on roads in mountainous districts where the snow fall is very great. They have found considerable favor in the Western States. The rotary steam snow shovel is a powerful machine, carried in a heavy frame, made of steel I and channel beams. A boiler and double cylinder engine of the locomotive type are carried, which are connected by heavy steel pinions to a bevel gear on a horizontal shaft.

Upon this shaft is mountetd the rotary wheel, consisting of a series of 12 rotary shovels with automatic reversible cutting blades. This is rotated in a drum, or casing, having a square. front which cuts the snow not reached by the knives to a width of 10 feet 6 inches or more if required.

The cutting blades slice the snow from the bank into the shovels, which, with the centrifugal force of the wheel, discharge the snow in a solid stream through a shute on top of the drum, to either side of the track desired, and to a distance of from one to two hundred feet. The speed of the wheel is from one to two hundred revolutions per minute. This machine is equipped with an ice plow and flanger—the former to protect it from derailment by snow and ice—the latter, for cleaning the flange and rail every time it passes over the road. Coal and water for the rotary are carried in an ordinary locomotive tender, coupled to the rotary for this purpose. One standard locomotive is required to push this machine in any kind of snow.

The Jull centrifugal snow excavator has a "scoop" in front, 10 feet or more wide and 11 feet high, consisting of a square shaped open front box, within which revolves the "snow cutter." The "snow cutter" consists of an inverted truncated cone, inclined downward and laterally, upon which are riveted four helical, sharp edged cutting blades, which slice off the snow, gather it into the "scoop," and, by centrifugal force, discharge it to either side of the track separately, or to both sides at once, through openings in the "scoop." The diameter of the cone from the outer edge of one cutting blade to that of its opposite blade is, at the large or upper end, 10 feet, at the small or lower end 3 feet. The "snow cutter" is operated by an engine of locomo-

tive design, having two cylinders, 18-inch diameter, 24-inch stroke. The excavator is equipped with separate flanger and ice cutters, which are controlled and operated by the pilot by means of compressed air, and it is equipped with Westinghouse air brake. Two hundred revolutions of the "snow cutter" are made to 175 revolutions of the engine. In actual service, the number of revolutions of the "snow cutter" varies from 150 to 250 revolutions per minute according to the difficulty of the work to be done.

SNOW FLANGER. A plate of iron or steel attached to a car or engine to scrape away snow and ice on the sides of the heads of the rails so as to make room for the flanges of the wheels. The term is sometimes applied to an adjustable plow fitted to a locomotive or car which extends low down onto the track and has a plate or tool for cutting and scraping the snow and ice from the rail.

SNOW SCRAPER. A plate or bar of iron or steel attached to an engine or car to scrape away the snow and ice from the rails.

SNOW'S BOLTLESS STEEL TIRED CAR WHEEL. FIGS. 4187-95 One of the many forms of steel tired car wheels in use. The tire is prevented from crowding in toward the centre of the axle by a heavy cast steel lip on the tire, which engages in the cast center, and the tire is held in place against this lip or lug by a retaining ring somewhat of the Gibson form, and shows in FIGS. 4188-90 and 4195. The other parts of the wheel are the tire with its internal flange, or lip, the retaining ring and the cast iron center.

SOAP DISH. FIGS. 2771-76; 7, FIGS. 2798-2800.

SOAP HOLDER. A soap dish attached to a partition like a bracket.

SOCKET. "Any hollow thing or place which receives and holds something else."—Webster. As the socket for water cooler valve. See also,

BERTH CURTAIN ROD BUSHING, OR SOCKET.
REVOLVING CHAIR STAND SOCKET.
FLAG HOLDER SOCKET.

SOCKET CASTER. FIG. 3352. A fixed or rigid caster. Not properly a caster at all, except by custom of the trade. See CASTER.

SOCKET WASHER. FIG. 521. A large washer with a cavity to receive the head or nut of a bolt or rod so that it will not project beyond the surface of the wood to which it is attached. Also called cup washer.

SOFA (Sleeping Cars). A longitudinal seat which makes up by pulling out sidewise so as to drop the back. Now used only in staterooms.

SOFA ARM REST BOLT. FIGS. 3373-74.

SOFA ARM REST FIXTURES. FIGS. 3361-74.

SOFA BACK LEG SOCKET. FIGS. 3371-72.

SOFA BACK PIVOT HINGE AND BUSHING. FIGS. 3365-66.

SOFA BOLT (Sleeping Cars). FIG. 3375. A sliding bolt used for holding a sofa in its place. It is operated from the front by a sofa pull working through a sofa crank. Sofas standing against the side of the cars are now little used, except in private cars.

SOFA CASTER. FIGS. 3350-53. See CASTER.

SOFA FURNISHINGS. FIGS. 3350-78.

SOFA HINGE. FIGS. 3359-60. A hinge by which the seat and back of a sofa are fastened together so that they can be changed from a sofa into a bed. See SEAT HINGE.

SOFA LEG HOOK. FIG. 3378.

SOFA RAIL END AND SOCKET. FIG. 3385.

SOFA SPRING (English). See SEAT SOFA SPRING. BACK SQUAB SOFA SPRING.

SOFFIT BOARD. 1215, FIGS. 388-91. A board which forms the under side or ceiling of some subordinate part or member of a building or a car, as of a staircase or cornice. See, DECK SOFFIT BOARD.

SOIL HOPPER. FIGS. 3091-95. See CLOSET HOPPER.

SOLE BAR (English). American equivalent, side sill. One of two longitudinal bars which are the main members of the UNDER FRAME, which see. In English car construction the side sills are relatively more important than in America.

SOLE BAR ANGLE IRON (English). An angle iron secured to the sole bar, to stiffen it. A plate is sometimes used instead of an angle iron.

SOLID BRAIDED BELL CORD. FIG. 1828. See, BELL CORD.

SOLID LEATHER NAILS. FIGS. 2896-2905. A form of ornamental nail for finishing work, in which the head is of solid leather. The same principle is applied to the manufacture of solid leather buttons, also much used for decorative purposes.

SOLID WROUGHT IRON SINGLE SPOKE WHEEL. A wheel in which the spokes, hub (boss) and rim are all welded together, each spoke consisting of one single bar. The tire is shrunk on.

SOULE RAWHIDE LINED DUST GUARD. FIG. 4084.

SPACING BLOCK (Pintsch Lamp). 292, FIGS. 2605-21.

SPACING BLOCK. See BODY BOLSTER SPACING BLOCK.

SPANNER. A wrench for uncoupling hose, etc., formed like the arc of a circle, with notches or lugs for engaging into dogs or grooves on a spanner nut. An ordinary wrench is termed a spanner in England.

SPANNER BAR (Buhoup Vestibule). 6 and 94, FIGS. 1526-1630.

SPANNER BAR BOLT (Buhoup Vestibule). 111, FIGS. 1526-1630.

SPEAR ANTI-CLINKER CAR HEATERS. Heaters or stoves manufactured by James Spear, of Philadelphia, for heating cars, and made with a sheet iron outside casing which leaves an air space between the stove and casing, into which a current of air is admitted, and is warmed by coming in contact with the stove, and then escapes into the car. Several different patterns are made. In one, the cold air is admitted through a hood on top of the car, is carried down to the bottom of the stove by a pipe, and then circulates around the pipe, and enters the car through a hot air pipe which extends the whole length of the car, with registers at each seat. In another pattern the hot air pipe is not used, the warmed air escaping directly into the car through openings in the base and top of the stove. In this pattern an independent cold air pipe is not used, but the smoke pipe is inclosed in a casing, with a space between the two, through which the cold air descends and passes over the stove and escapes.

The "anti clinker" feature of these heaters consists in a peculiarly arranged grate, with an annular opening between it and the base of the stove, through which the clinkers can be removed from the grate.

SPEAR'S DRAFT REGULATOR. A device by which an air inlet is opened in the smoke pipe in such manner that the draft is checked, but no gas is permitted to escape, the current being entirely inward.

SPECIFICATIONS, CAST IRON WHEELS. See WHEELS, SPECIFICATIONS FOR CAST IRON WHEELS.

SPIDER (Pintsch Lamp). 302 and 284, FIGS. 2605-21.

SPIDER DIAPHRAGM (Pintsch Lamp). 384, FIGS. 2605-21.

SPIDER PLATE, OR UNDERFRAME PLATE (English). A flat horizontal wrought iron bar connecting two or more timbers of the underframe together, and being placed beneath them prevents one sinking below the others. It is often made with three or more arms radiating from a common center; hence its name.

SPINDLE. See DOOR LATCH SPINDLE.

SPIRAL ELLIPTIC SEAT SPRING. A spring made of a thin band of steel wound in a spiral coil, the transverse section of which is elliptical.

SPIRAL SASH SPRING. See SASH SPRING.

SPIRAL SEAT SPRING. The common form of SEAT SPRING, which see.

SPIRAL SPRING. FIGS. 4652-58. A spring made of a metal rod or bar coiled in the form of the thread of a screw, so that it can be compressed or expanded in the direction of the axis around which it is coiled. Most of the springs now in use in car work, except the bolster springs of passenger cars, are spiral springs. Volute springs, india rubber springs, compound or wool packed springs are quite obsolete. Spiral springs are designated as single, double, triple or quadruple coil springs when nested one inside the other. Such springs are also called nest springs. Usually the single springs or nest springs are again combined into two group, four group, six group, etc., springs. Two to eight group springs are the most common. Graduated springs seem to have had their day, and are not often specified for new construction. The various springs in them come into action successively as the load increases, instead of all at once. Spiral springs are also designated according to the section of bar, as round bar, flat bar, square bar, half round bar, oval bar, edge rolled, etc., but nearly all springs are now made from round bar steel. Equal bar is a term applied to nest springs made from bars of such size that the resistance of the coil is proportioned to its diameter. Spiral springs are also designated according to their use, as equalizer springs, journal springs, pedestal springs, bolster springs (which latter are the main springs of a car), buffer springs, draft springs, etc.

SPIRAL SPRING CAP. 75, FIGS. 3781-3951; FIGS. 4652-58. A casting or plate which forms a bearing for the top of a sprial spring, and which also holds it in its place. A seat is used at the other end, but both these parts in bolster springs are commonly called SPRING PLATES, which see.

SPITTOON. FIGS. 2171-79, etc. A vessel to receive the discharges of spittle and other abominations. A CUSPIDOR, which see, is the same thing in a different form.

SPLASH BOARD. A board attached in an inclined position covering up the back of passenger car steps. It serves much the same purpose as the risers of steps, and prevents mud and dirt being thrown on the steps. Not in general use.

SPLASHER (English). An iron plate attached to the floor above the wheels. Only used when the wheels are too large in diameter to clear the ordinary floor. Also called wheel cover or wheel plate.

SPLICE. 1. "The union of ropes by interweaving the strands."—Webster. Hence any appliance by which the ends of a rope, cord, beam or bar, are united. See BELL CORD SPLICE.

2. (For Car Sills.) See, SCARF JOINT. SHIP SPLICE. According to the rules for the interchange of cars of the Master Car Builders' Association, the splice of a sill to be received must be 24 in. long. See, INTERCHANGE OF TRAFFIC.

SPLIT KEY. FIGS. 551-2. A form of pin which is self fastening, consisting essentially of two parallel strips or bars of metal, which, when united, constitute one pin, but which tend to spring apart, so that the pin cannot be withdrawn without the use of considerable force.

SPOKE. "One of the radial arms which connect the hub with the rim of a wheel."—Knight.

SPOKE WHEEL. FIGS. 4154, etc. A wheel, the rim or tire of which is connected with the hub by spokes instead of one or more plates. These spokes are sometimes made of solid cast iron, in others they are cast hollow, and in still others are made of wrought iron or cast steel.

SPOOL (of hoisting gear). The drums on which the hoisting rope or chain is wound.

SPOOL SHAPED SPIRAL SPRING. This form was patented by W. P. Hansell in 1874-5. Its object is to obtain a GRADUATED SPRING, which see. Little used.

SPRING. FIGS. 4138-51, 4652-58. Elliptic springs, FIGS. 4138-49. An elastic body to resist concussion. Springs are also used to produce motion in a reverse direction to that caused by some other applied force, as a brake spring and the spring of a door latch. The leading forms of springs are ELLIPTIC SPRINGS and SPIRAL SPRINGS, which see. Spiral springs are designated according to the number combined together one within the other, as double coil, triple coil, etc.; or, if the springs are placed side by side, as two group, four group, six group, etc.; elliptic springs, according to the number united to work together as one spring, are designated as double or duplicate, triple or triplicate, quadruple, quintuple and sextuple. The main springs about a car are nearly all spiral springs, except that elliptic springs are almost exclusively used for the bolster springs of passenger cars.

The principal springs of a car supporting its weight are the bolster springs, also called bearing springs or body springs. Equalizing bar or equalizer springs are used in addition on passenger cars, as also sometimes journal springs. Side journal springs are used on street cars, and are sometimes keg shaped or spool shaped. Tension is communicated through the draw spring or springs.

In European practice bearing springs are semi-elliptical; buffing and draft springs are rubber, semi-elliptical spiral or volute. The seat cushions and backs are supported by sofa springs. The tendency to-day of American practice is toward single and double coil, round bar springs for car work. The use of 7, 8, 9, etc., coil bolster springs is rare, and the great majority of bolster springs used under new freight cars are the three and four coil springs shown in FIGS. 4652-58, etc. For equalizer springs the universal practice is to use plain single and double coil, round bar spiral spring.

SPRINGS AND SPRING CAPS. (M. C. B. Recommended Practice.) FIGS. 4652-58, 4664-67. In 1898 detail designs of spring coils and caps suitable therefor were adopted as Recommended Practice, and were then shown on Sheet J.

In 1901 a committee presented revised drawings, with full details and specifications. They were submitted to letter ballot and adopted as Recommended Practice, and are now shown on Sheet H, FIGS. 4652-65.

In 1901 designs, with full details and specifications for springs for 100,000 pound capacity cars, were presented, and as a result of letter ballot were adopted as Recommended Practice. See FIGS. 4666-67.

SPRING ABUTMENT (Reducing Valve). 22, FIG. 952.

SPRING BAND (Elliptic Springs). A wrought iron strap which embraces the plates at the center.

SPRING BEAM (Six Wheeled Trucks). 42, FIGS. 3948-51. A transverse timber which rests on top of the bolster springs. There are two such to each truck, on which the bolster bridges, which support the bolster, rest.

SPRING BLOCK. 74, FIGS. 3781-3951. A piece of wood used as a distance piece above or below a spring.

SPRING BLOCKS. FIGS. 3969-71. Blocks to which the equalizer spring caps are attached. They are made right and left.

SPRING BOX (Pump Governor). 38, FIGS. 947-50 and 3, FIGS. 963-64. (Automatic Reducing Valve), 3, FIGS. 952-53.

SPRING BOX (Janney-Buhoup Platform). 961, FIGS. 1526-1613.

SPRING BOX HOLDER (Janney-Buhoup Platform). 932, FIGS. 1526-1613.

SPRING CAP. A cup shaped piece of cast or wrought iron for holding the top of a spring and against which the latter bears. They are further distinguished by the name of the spring, as bolster spring cap, etc. The spring seat comes below the spring, but both these parts are very commonly called spring plates, especially in large group springs.

SPRING DOOR LATCH. FIGS. 2086-88, etc. A latch, the bolt of which is thrown into contact with a catch by a spring, and is disengaged by a knob or handle. Such latches are not arranged so as to be fastened with a key. See, LATCH.

SPRING DOOR LOCK. FIGS. 2077-78, etc. A lock usually called a night latch. See, LATCH.

SPRING EDGE (Car Upholstery). FIGS. 3230-32, etc. A term applied to a method of upholstery which protects the frame work entirely by springs, so that it is not felt by the occupant of the seat.

SPRING HANGER. 1. (Elliptic Springs.) 170, FIG. 349, and 46, FIGS. 3781-3951. A T-shaped bolt or an 8 or U-shaped iron strap which sustains the end of a semi-elliptic spring. The T-hanger is a bolt with a T-head passing through a slot in the spring, used in locomotives, but not on cars. The 8-shaped hanger is a wrought forging with holes at each end for two bolts, FIG. 349.

SPRING HANGER IRON OR BRACKET (Cabooses, etc.). 171, FIG. 349. A bent bar fastened to a pedestal timber or wheel piece, to which the spring hangers are attached.

SPRING HINGE. FIGS. 1971-72. See, DOUBLE ACTING SPRING HINGE.

SPRING LINK, OR SPRING SHACKLE (English). American equivalent, spring hanger, a term also used in England. A link attached to the end of a laminated spring by which the weight is placed upon it.

SPRING LINK ADJUSTING SCREW, OR TEE BOLT (English). An eye bolt by which the tension of the bearing spring, and, to some extent, the height of the car body above the rails can be regulated. Rarely used except in passenger service, where it is very general. A different style, having the bolt vertical, is the same as above, except that being vertical, it cannot put initial tension on the spring.

SPRING PADLOCK. A padlock, the hasp of which can be locked by pressure only, without a key; so called in distinction from a dead padlock.

SPRING PIN. 41, FIGS. 3781-3951. See, LATERAL MOTION SPRING PIN (Passenger Car Trucks).

SPRING PLANK. 43, FIGS. 3735-3951, and FIGS. 3815-6. A transverse timber underneath a truck bolster and on which the bolster springs rest. Also called sand plank or sand board. A SPRING PLANK SAFETY STRAP or GUARD, which see, passes under the spring plank. In iron trucks, iron spring plank bars take the place of the wooden spring plank, and in other trucks they are very common. A swing spring plank is used in passenger and other SWING MOTION TRUCKS (which see). In rigid bolster trucks the spring plank is bolted to the lower arch bar of the truck frame.

SPRING PLANK BARS (Iron 6-Wheel Truck). See above.

SPRING PLANK BEARING. 44, FIGS. 3781-3951. A casting on which a spring plank rests, and which is supported by the lower swing hanger pivot. Also called cross bar casting or spring plank carrier.

SPRING PLANK FLITCH PLATES (Passenger Truck). See, FLITCH PLATE.

SPRING PLANK SAFETY STRAP (Passenger Car Trucks). 45, FIGS. 3781-3951, and FIGS. 3873-75. A U-shaped strap of iron attached to the transoms, and passing under the spring plank, so as to hold it up in case the swing hangers or their attachments should break.

SPRING PLANK TIMBER (Framed Spring Plank). A timber forming one of the sides.

SPRING PLATE. FIGS. 3802-03, etc. A common term for spring seats and caps, especially those of considerable size, as for bolster springs. They are often provided with spring plate lugs to hold the spring in place.

SPRING POCKET (Strap Drawbar). See below.

SPRING POCKET, OR STRAP, DRAWBAR. A drawbar with a rectangular strap or "pocket" at the back end, in which the draft spring is placed. So called in distinction from a tail bolt attachment. See, YOKE. Practically all drawbars are now attached with a yoke or strap, and this form is the Recommended Practice of the M. C. B. Association.

SPRING SEAT. 74, FIGS. 3781-3951. A cup shaped piece of cast or wrought iron, on which the bottom of a spring rests. See, SPRING CAP. SPRING PLATE.

They are further distinguished by the name of the spring for which they serve, as bolster spring seat, equalizer spring seat, etc.

SPRING SHACKLE (English). See, SPRING LINK.

SPRING STUD (Street Cars). A round iron bar which rests on the top of the journal box or spring seat and passes through the centre of a spiral spring. The upper end works in a guide and thus holds the spring in its place. A similar bar has been used on steam cars for transmitting the weight from the spring to the journal box.

SPRUE (Foundry). The piece of metal which fills the gate or channel through which the metal is poured in making a casting. This piece is broken off when the casting is cooled. The gate itself is often called a sprue.

SPRUE HOLE. A gate of a mold for casting metals.

SPUD. FIGS. 2758-59. A bushing or coupling by which the hole of a sink or water cooler drip is connected with the drain or drain pipe.

SPUR WHEEL. 1. (Hoisting Gear, etc.) Literally any cog wheel, but usually meaning the larger one of a pair of wheels in gear, in distinction from the pinion, which is the smaller one of the two.

2. (Lever Hand Car.) 5, FIGS. 4722-27.

SQUAB CUSHION. One formed of a bag or case stuffed with curled hair or other elastic material, not attached to the seat, but simply laid upon it. Now little used, box cushions being preferred. See, CUSHION.

SQUARE BOLT HEADS. In 1899 the following dimensions for square bolt heads were adopted as Recommended Practice:

The side of the head shall be one and one-half times the diameter of the bolt, and the thickness of the head shall be one-half the side of the head.

In 1900 these dimensions were adopted as a Standard.

SQUARE DOOR BOLT. FIG. 1894, etc. A door bolt made of a square and straight bar of metal. When the bolt has an offset it is termed a square neck door bolt, as in FIGS. 1896-97.

SQUARE END. A rectangular piece on the end of a shaft to which a crank or wrench can be applied; also termed winding arbor or crank pin.

SQUARE LANTERN. A form having glass on three sides, used chiefly for fixed lights.

SQUARE ROOT IRON. A term applied by manufacturers to angle iron in which the corners are brought to a sharp angle and not rounded off. Square root iron is one form of angle iron, but is never meant when that term alone is used.

STAKE (Flat or Gondola Cars). 42, FIGS. 246-50, 271-95.

1. (Flat Cars.) A stick of wood attached to the outside of the sills by a STAKE POCKET or STAKE POCKET STRAP and STAKE BOLT, which see, to keep the load from falling off. They are sometimes attached by swiveling bolts, so that they can be dropped if desired along the side of the car.

2. (Gondola Cars.) A similar piece, attached by stake pockets to the sills and fastened to the side plank, usually on the outside, but sometimes on the inside, by bolts. In steel cars the stakes are formed of angles or pressed T shapes.

STAKE BOLT (Gondola and Flat Cars). A bolt passing through the end of the stakes, serving in connection with the STAKE POCKET STRAP, which see, in place of the ordinary form of stake pocket.

STAKE HOOK (Flat Cars). A hook on the side of a flat car to hold a swiveling stake in an upright position.

STAKE POCKET (Gondola and Flat Cars). 39, FIGS. 223-26, 246-50, 271-95, etc. A cast iron receptable attached to the side sills by U bolts to receive the end of a stake. A substitute is the STAKE POCKET STRAP, which see.

STAKE POCKET STRAP OR U-BOLT (Gondola, Flat and Stock Cars). A U-shaped bolt flattened at the side, and serving as a substitute for the ordinary form of stake pocket, when the stakes are intended as permanent attachments.

STAKE POCKET U-BOLT. A U-bolt applied to a stake pocket that encloses three sides of the stake and pocket and passes through the flange holes into the side sill, to which it is bolted.

STAKE REST (Flat Cars). A bracket or support on which a stake rests when turned down horizontally.

STAKE SLEEVE (Flat or Gondola Cars). A casting with a horn shaped projection slipped over a stake to hold up the hinged side of a platform or gondola car.

STANCHION. 1. A prop or support.

2. (Nautical.) A term very generally, but not exclusively, used for posts with an eye in one end, which carries a rope.

3. (Car and locomotive work.) By analogy from nautical use, a metal post or hanger with an eye in one end, which holds a rod or other object, as a hand rail or curtain rod. The opposite end is usually fastened by a nut, or with a flange or lugs, which form a part of the stanchion. Also see, WINDOW CURTAIN ROD STANCHION.

STAND. "Something on which a thing rests or is laid."—Webster. See,

RADIATOR STAND. SEAT STAND.
REVOLVING CHAIR STAND. WATER COOLER STAND.

STANDARD. 1. A name sometimes applied to the COLUMN or BOLSTER GUIDE BAR, which see.

2. (Of M. C. B. Association.) A considerable list of standard details of cars, given under Master Car Builders' Association, have been adopted. See, MASTER CAR BUILDERS' STANDARDS.

In 1893, when the old standards of the Master Car Builders' Association were divided into two groups, the group which retained the name standard was defined as "Those forms, parts, constructions, units, measurements or systems in which it is desirable to secure not only sound construction, good practice and safe operation, but which also promote quick and cheap repairs and consequent free interchange of cars."

The group termed Recommended Practice was defined as "Those forms, parts, constructions, units, measurements or systems which are conducive of sound construction, good practice and safe operation, but which do not affect either interchangeability of parts or interchangeability of cars as a whole."

STANDARD AXLES (M. C. B.). See, AXLE.

STANDARD BOLTS AND NUTS (Table). See, SELLERS STANDARD.

STANDARD CAR AXLE (M. C. B.). See, AXLE.

STANDARD CAR COUPLER (Freight). FIGS. 1299-1308; Passenger, FIGS. 1514-25.

STANDARD CHECK GAGE, FOR MOUNTING WHEELS (M. C. B.). Adopted in 1894. See, CHECK GAGE.

STANDARD DRY CLOSET. FIGS. 3115-19. See, DRY CLOSET.

STANDARD GAGE. The most common distance between the rails of railroads, which is throughout the world 4 ft. 8½ ins. See, GAGE. This gage originated from the use of an even 5 ft. gage, with outside flanges. As inside flanges came to be preferred, and had to run on the same rails (then with much narrower heads than now), the present standard was of necessity used.

STANDARD JOURNAL BEARINGS AND WEDGES (M. C. B.). See, JOURNAL BEARINGS.

STANDARD JOURNAL BOXES (M. C. B.). See, JOURNAL BOXES.

STANDARD PEDESTAL (M. C. B.). See, PEDESTAL.

STANDARD SCREW THREADS (M. C. B.). See also, SELLERS and WHITWORTH. See, SCREW THREADS.

STANDARD SPLICE (M. C. B.). See, INTERCHANGE OF TRAFFIC.

STANDARD STEEL CO.'S STEEL TIRED WHEELS. FIGS. 4206-13.

STANDARD STEEL PLATFORM. FIGS. 1631-93. A platform construction for passenger cars, combining a draft gear and buffer plate mechanism. The platform sills are of I-beams, which are continuous back to the bolster. It is the standard construction on Pullman cars and on large numbers of other passenger cars.

STANDARD WHEEL GAGE (Between Backs of Flanges; M. C. B.). See, WHEEL GAGE.

STANDING OR PARTITION PILLAR (English). American equivalent, post. An upright piece in the body running its entire height. The term is not applied to the CORNER or DOORWAY PILLARS, which see.

STAPLE. A U-shaped piece of wrought iron pointed at the ends, to be driven into wood to hold a hasp, hook, pin, etc. The term is also applied to a wrought or cast iron keeper, which is screwed or bolted to the door post or frame, and over which a hasp fits.

STAR VENTILATOR. See, VENTILATORS.

STATEROOM. FIG. 94. A compartment in sleeping and private cars, sometimes containing a stationary bed and in other designs the usual berths. Also termed DRAWING ROOM, which see.

STATIONARY LOCK (Freight Cars). FIGS. 2091-96. A lock permanently fixed to the door or side of the car, in distinction from padlocks, which are quite out of use on freight cars.

STAY. A beam, bar, rod, etc., by which two or more objects are connected together to prevent lateral deviation of one or both of them.

See, BODY QUEEN POST STAY. PIPE STAY.
CENTER STAY. SILL STEP STAY.
LAMP STAY.

STAY ROD. 1. A rod which acts as a stay. See, PEDESTAL STAY ROD, 7, FIGS. 3781-3951.

2. (Of a Derrick or Crane.) See, TENSION RODS.

STEAM CAR. A term used to designate ordinary railroad cars when it is desired to distinguish them from street cars.

STEAM CHEST BUSHING (Air Pump). 16 and 17, FIG. 965.

STEAM CHEST CAP (Air Pump). 15, FIG. 965.

STEAM CYLINDER (Air Pump). 61, FIGS. 893-94, 1-2, FIG. 965. The admission of steam to this cylinder is controlled by the reversing piston and reversing valve, which operate the main steam valve. See, CYLINDER.

STEAM CYLINDER GASKET (Upper and Lower, of air pump, etc.). 50, 51, FIG. 965; 101-2, FIGS. 893-94. See, GASKET.

STEAM CYLINDER HEAD (Air Pump). 2, FIG. 19; FIG. 965. A cover for the top of the steam cylinder.

STEAM DRUM (Car Heating Apparatus). FIGS. 2301-05. A part of every indirect steam heating system, being the covered coil or nest of tubes in which the circulating water is heated by the steam surrounding the pipes.

STEAM PIPE UNION (Air Pump). A pipe coupling, which is often called a union.

STEAM PISTON (Air Pump). 21-22, FIG. 965; 65, FIGS. 893-94. See, PISTON.

STEAM PISTON PACKING RING (Air Pump). 33, FIG. 965. See, PISTON.

STEAM TRAP (Car Heating). FIGS. 2306-7, 2312-13, 2355-84, 2411, etc. A device for catching and liberating the water of condensation in any steam pipe line. There are a large number of special forms made by each company which has a steam or hot water system.

STEAM VALVE, OR MAIN STEAM VALVE (1) (Air Pump). FIGS. 893-94. A peculiar device for controlling the admission of steam to the steam cylinder of the engines and air pump, by means of the REVERSING PISTON, which see. See, MAIN STEAM VALVE.

(2) (Pump Governor.) 25 and 26, FIGS. 947-50, and 1, 5, 6, FIGS. 963-64.

STEAM VALVE BUSHING (Air Pump). See above, and UPPER AND LOWER STEAM VALVE BUSHING.

STEAM VALVE CYLINDER (Pump Governor). 32, FIGS. 947-50.

STEAM WRECKING CAR. See, DERRICK CAR and WRECKING CAR.

STEEL TIRE, MINIMUM THICKNESS. (M. C. B. Recommended Practice.) FIG. 4531. In 1894 a Recommended Practice was adopted for minimum thickness for steel tires of car wheels to be 1 in., to be measured normal to the tread and radial to the curved portions of the flange through the thinnest part within 4¼ ins. from the back of the flange; the thickness from the latter point to the outer edge of tread to be not less than ½ in. at thinnest part, as shown in FIG. 4531.

A further practice was adopted of cutting a small groove, as shown in the outer face of all tires when wheels are new, at a radius ¼ in. less than that of the tread of tire when worn to the prescribed limit, to facilitate inspection.

STEEL TIRED WHEEL. FIGS. 4152-4213. A wheel with a steel tire. In the MCKEE-FULLER and WASHBURN WHEELS, which see, the tire is welded to the body or center of the wheel, which is made of cast iron. The term, unless otherwise stated, however, always means that the tire is shrunk on, bolted or fastened with retaining rings.

STEEL UNDER FRAMING, GENERAL DIMENSIONS OF CARS. (M. C. B. Recommended Practice.) In 1897 individual designs for steel under framing for freight cars were submitted, and the persons submitting such designs agreed on general recommendations as follows, which were submitted to letter ballot and adopted as Recommended Practice of the Association:

First.—That the inside length should be 34 feet for a standard box car of 60,000 pounds capacity.

Second.—The inside width should be 8 feet 4 inches for a standard box car of 60,000 pounds capacity.

Third.—The height from the top of the floor to the top of the plate should be 7 feet 6 inches for a standard box car of 60,000 pounds capacity.

Fourth.—The width of the side door should be 5 feet 4 inches clear for all box cars.

Fifth.—The end doors, if any are used, should be 24 inches wide by 36 inches high.

Sixth.—The height from the top of the rail to the top of the floor should be 4 feet 2 inches.

Seventh.—The design should show the end sill flush, and not projecting beyond the siding.

The dimensions above given for standard interchange box cars, as far as length of sills, width and height from the rail are concerned, should be adopted also for other flat bottom freight cars of 60,000 pounds capacity, such as stock, gondola and flat cars, so that same style of sills, bolsters, end sills and draft gear will suit for all these classes of cars of the same capacity. The cubic capacity for interchange box cars should be 70 cubic feet per ton of 2,000 pounds.

STEM. See, BUFFER STEM. GRADUATING STEM. REVERSING VALVE STEM. SMOKE BELL STEM. The rod to which a valve of any kind is attached is always called a stem.

STENCILING CARS. (M. C. B. Standard.) In 1896 it was decided:

That on all box cars standing more than twelve (12) feet from top of rail to eaves, the width at eaves be stenciled in 3 inch letters on side of car, as near the bottom as convenient.

That all box, stock and other roofed cars have the number and initials stenciled in 3 inch letters on outer face of outer floor timber between cross tie timbers, except where cars are ceiled over underneath, in which case the stenciling shall be put on inside face of each cross tie timber in center.

That all classes of cars have style of coupler and rear attachments and style of brake beams stenciled in not less than 1½ inch letters near one end of car on each side, or on each end of car directly above the buffer blocks, where design of car permits it.

That where the construction of the truck permits, trucks shall be stenciled on each side, giving the size of journal, and the letters "M. C. B." if the axle is M. C. B. standard axle. If the axle is not M. C. B. standard, use dimensions from center to center of journal in place of M. C. B. This stenciling to be in 1¼ inch letters, and to be put on end or side of bolster in Diamond trucks, and on side truck frame in center on pedestal type of trucks.

That on all cars equipped with air brakes the words "Air Brake," in letters not less than 3 inches high, be stenciled on the sides or ends of the cars, and that the make of air brake equipment be stenciled (in smaller letters, if desired) over or just preceding these words, to enable inspectors to detect repairs made with wrong material. Initials of the road should also appear in letters not less than 2 inches high on one side of bolster or transom of each truck.

In 1901 this was changed from Recommended Practice to Standard, as a result of letter ballot.

In 1902 the following additions were made to prevent errors in filling out M. C. B. defect and repair cards, and to at once identify the end of car on which defects are found or repairs made.

"All freight equipment cars used in interchange shall be stenciled with a letter 'B' on the end of car upon which the brake shaft is located, and with the letter 'A' on the opposite end. On cars having brake shafts on both ends, the end toward which the brake cylinder push rod travels should be stenciled 'B,' and the opposite end 'A.' This stenciling shall be in plain, black letters, not less than 1½ inches high, enclosed in a circle not less than 2¾ inches in diameter, as shown in FIGS. 1 and 2.

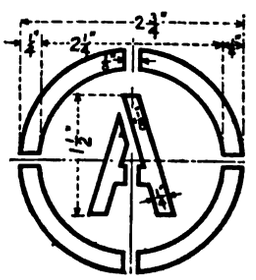


FIG. 1.

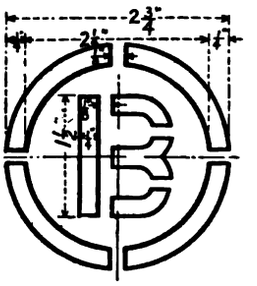
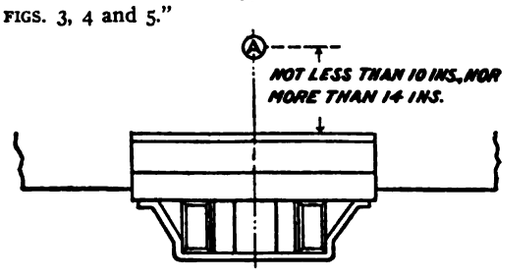


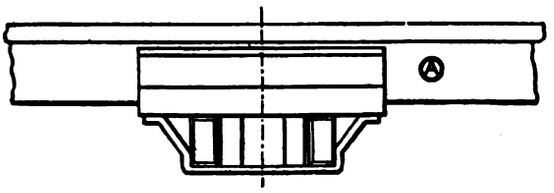
FIG. 2.

"The location of the lettering to be as near the center line of end of car as convenient, and where possible be not less than ten inches nor more than fourteen inches above the buffer block, on box, stock and other classes of cars having stationary ends, and to be located on the end sill near the buffer block, or on the face of the buffer block near the top, on other classes of cars. See FIGS. 3, 4 and 5."

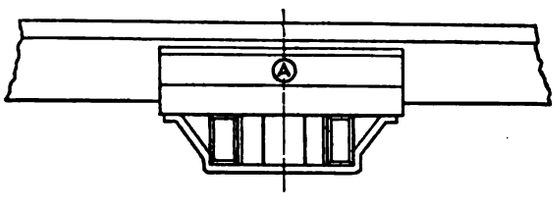


LOCATION OF LETTERING FOR BOX STOCK AND OTHER CARS HAVING FIXED ENDS.

FIG. 3.



LOCATION OF LETTERING FOR FLAT AND OTHER CARS NOT HAVING FIXED ENDS.
FIG. 4.



LOCATION OF LETTERING FOR FLAT AND OTHER CARS NOT HAVING FIXED ENDS.
FIG. 5.

STEP. 1. A ledge on a stair or round or rung of a ladder.

2. A foot piece for ascending to or descending from a car or for standing in certain places or positions. Passenger car steps are from their locality called platform steps, or from their material box steps. In freight cars a U-shaped iron, called the SILL STEP, which see, is used, and a kind of platform on the roof, called the roof step. A small ledge on the end of a freight car near the top for a brakeman to stand on when applying brakes, called the brake step, is also used, but it is not recommended by the Master Car Builders' Association, but it is considered good practice on many roads. A bracket called a tank step is attached to the tanks of tank cars. Steps in stairs are connected by vertical risers.

STEP FACINGS. FIGS. 3036-37. A metallic facing for the step hanger.

STEP HANGER. 48, FIGS. 360-72, 388-91. A vertical wrought iron bar by which the steps are supported from the corner of a car and from the platform timber.

STEP IRON. 1. (Platform Steps.) 47, FIGS. 360-72. A flat iron bar bent to conform to the shape of the steps and their risers, and to which they are fastened. It is bolted at the upper end to the platform sill.

2. (English.) Also called leg iron. A wrought iron forging attached to the sole bar, and supporting the upper and lower FOOT BOARDS, which see.

STEP LADDER (Sleeping Car). A folding step ladder, for use in a sleeping car, to reach the lamps, upper berths, etc.

STEP LADDER HINGE. FIG. 1970.

STEP MOLDINGS OR NOSINGS. FIGS. 3030-32. A metallic facing or molding for the tread of steps.

STEP RISER. The vertical portion of a step in stairs.

STEP TIMBER. A timber bolted to the end sill and platform end sill, to which the platform steps are hung.

STERLINGWORTH BRAKE BEAM. FIGS. 842-51. A brake beam made of deck or bulb iron shapes and not trussed.

STERLINGWORTH BOLSTER. FIGS. 806-10. One of a number of built up bolsters for body and truck using flat plates and channels.

STERLINGWORTH FLAT CAR. FIGS. 227-30. A flat car with structural steel underframing and wood floor. Diagonal braces extend from the center of the center sills to the side sills between the cross tie and the bolster, adding to the lateral strength.

STERLINGWORTH HOPPER CAR. FIGS. 300-03. A hopper car built entirely of structural steel shapes. The sides are built up of 12 in. channels, riveted through the flanges, and extend beyond the hopper overhang to the end sill.

STERLINGWORTH HOPPER GONDOLA CAR. FIGS. 279-82. An all steel car built of structural shapes. The sides are made of channels reinforced at the corners with angle plates and riveted to each other through the flanges. Sometimes called a "Battering Ram" car on account of their longitudinal strength.

STERLINGWORTH TRUCK. FIGS. 3774-77. A pedestal truck built of structural shapes. The pedestal jaws on the outside are hinged and may be swung open, allowing the removal of a pair of wheels without jacking the truck clear of the boxes.

STILE. 8, FIG. 1029-37. The upright pieces on the outer edge of a door or sash, as door stile, sash stile, window blind stile, etc.

STIRRUP. 1. A kind of ring or bent bar of iron resembling somewhat the stirrup of a saddle. A drawbar carry iron is sometimes called a stirrup.

2. (Janney Platform.) 1111, FIGS. 1526-1613. A drawbar carry iron.

STOCK CAR. FIGS. 57-62, 212-222. A car made for transporting live stock, usually having a tight roof, but open grating sides and ends. Double deck stock cars are built for the carrying of sheep and hogs, and modern stock cars are so designed that they can be used as double deck cars if desired. In order to prevent suffering and injury to stock when carried, modern stock cars are provided with some of the devices that were formerly special to so-called palace stock cars. Stock cars are usually provided with at least the apparatus for feeding and watering.

STOP BAR (Sleeping Car). 49, FIGS. 1778-83. A bar to connect the two seats on which the seat bottoms may rest when drawn down to make up into beds. It rests upon a stop bar plate.

STOP BAR GUIDE. An attachment to hold a stop bar in place laterally.

STOP BAR HINGE. The hinge which enables the stop bar to swing horizontally.

STOP BAR PLATE. See, STOP BAR.

STOP BEAD, OR PARTING STRIP. More properly sash parting strip. The strip dividing the groove for the window sash and the groove for the blind.

STOP BOLT (of Car Door Lock). An attachment for throwing a door latch out of gear.

STOP COCK (for Brake Pipe of Air Brake). An ANGLE COCK, which see. A cock attached to the brake pipe of a Westinghouse automatic brake so that the pipe can be closed if the brake hose is to be uncoupled. If the compressed air were allowed to escape from the brake pipe, the brakes would be applied.

STOP KEY. See below.

STOP KEY JOURNAL BEARING. A key or wedge with a lug or projection which bears against the end of the axle to restrain lateral motion and thus dispense with a collar on the axle. See, STOP WEDGE.

STOP LATCH. A spring door latch with a stop bolt by which the latch can be fastened on one side so as not to act. Also, see, SALOON STOP LATCH.

STOP PLATE OR WEDGE (for Journal Box). A metal plate which forms an end bearing for the axle and checks its end motion. It is held in position either by flanges cast in the box, or by attaching it to the journal bearing or its key. Its object is to dispense with a collar. But little used.

STOP WEDGE. A stop key. See, STOP KEY JOURNAL BEARING.

STORAGE BATTERY. (Gould Electric Light.) FIG. 2636.

STORAGE HEATERS (Car Heating). FIG. 2352. See, DIRECT STEAM STORAGE.

STORM SASH FASTENERS. FIGS. 3706-07.

STOVE. An apparatus made usually of iron, variously constructed, in which a fire is made for warming a room,

house or car by direct radiation. When the warming is effected by convection, as with warm air, hot water, etc., the entire apparatus is called a heater. Stoves are out of use for heating passenger cars, but cast iron stoves are largely used for caboose cars.

A cook stove permanently fixed against the side of a room and directly connected with the chimney without the use of stove pipe, is called a range; used in dining cars, etc., FIGS. 2738-43.

STOVE PIPE. A tube, usually of sheet iron, for conveying the smoke from a stove or heater, and creating a draft. In heaters, commonly called SMOKE PIPE or SMOKE FLUE, which see.

STOVE PIPE CAP. A U-shaped piece of sheet iron fastened to the top of a stove pipe, serving as a rough form of JACK, which see.

STOVE PIPE DAMPER. A circular disk in the stove pipe for regulating the draft.

STOVE PIPE JACK. A covering or bonnet for the aperture of a stove pipe on the outside of a car. The term usually means a more elaborate structure than a stove pipe cap.

STOVE PIPE RING. A metal plate or ring attached to the ceiling of a passenger car around the opening through which the stove pipe passes from the inside to the outside of the car. It is used for ornament or to make a finish around the opening for the stove pipe.

STOVE PLATE. See, ASH PIT BOTTOM.

STOVE RING. A STOVE PIPE RING, which see, or a ring for Russia iron casing of a Baker heater, FIG. 2184, etc.

"STRAIGHT AIR" (Air Brake). A term applied to the original form of the Westinghouse air brake, which is still used on engines and tenders and street cars. FIG. 898.

STRAIGHT CLOSET HOPPER. FIGS. 3092-93.

STRAIGHT TANK (Tank Car). One with the rings or plates of metal placed alternately inside and outside of each other, in distinction from telescope tanks. See, TANK CAR.

STRAINER (Air Brakes). 16, FIGS. 910-28; FIGS. 957-62 See AIR STRAINER.

STRAINING ROD. See, BRACE STRAINING ROD.

STRAP BOLT, OR LUG BOLT. A round bolt with a flat bar of iron welded to it, and usually with a hook on the end which serves the purpose of a head. The flat bar has holes in it, by which it is attached to a piece of timber or other object by one or more separate bolts or screws.

STRAP BRAKE (Hoisting Gear). A method of controlling the spools by an iron strap which is pressed down upon the spool by a treadle.

STRAP DRAWBAR. A SPRING POCKET DRAWBAR, which see.

STRAP HANGER. FIGS. 1857-62, etc. See, BELL CORD HANGER.

STRAP HINGE. 1. FIGS. 1958-59. A door hinge, the two parts of which are made longer than those of a butt hinge, and of a triangular shape.

2. (English.) In a freight car (goods wagon) a hinge in which the pin is welded to two flat bars at each end, and the main part of the hinge is turned while hot over the pin. The hinge has thus no loose part. The main part or strap is secured to the door, which it stiffens. The flat ends of the pin are bolted to the car.

STRAP WASHER, OR WASHER PLATE. A wrought iron strap which takes the heads of several bolts.

STREET DRAFT GEAR. FIGS. 1235-45 and 1295-99.

STREET CAR WHEEL. FIG. 4223. A light cast iron single plate or open plate wheel.

STREETER STEEL BACK BRAKE SHOE. FIG. 1008. A skeleton driver brake shoe with hard white iron spiral inserts and cast iron body, steel back. FIG. 1014, a similar form of shoe for freight cars.

STRIKE PLATE. FIGS. 1900-1905. The keeper for a beveled latch bolt against which it strikes, so as to snap shut automatically. See, KEEPER, which is a general term including and often used as a substitute for strike plate.

STRIKER ARM. 9, FIGS. 3151-52. A SEAT ARM, which see. The terms striker arm, seat back arm and seat arm are used in the trade.

STRIKER PLATE. See, STRIKE PLATE.

STRING BOARD (Passenger Car Steps). A vertical board which supports the ends of the steps. A step hanger.

STRINGER. (Carpentry.) 1. "A horizontal timber connecting posts in a frame, as a tie timber of a truss bridge; a horizontal tie in a floor framing."—Knight.

2. (Bridge Construction.) The principal longitudinal timbers at the base of the roadway or track structure, analagous to the sills of cars. Hence, this name is often given to the sills of a car.

STRUT (of a Truss). A member subjected to a strain of compression. A vertical strut is usually called a post.

STUD. 1. (Carpentry.) "A small piece of timber or joist inserted in the sills and beams between the posts to support the beams or other main timbers. The boards on the outside and the laths on the inside of a building are also nailed to the studs."—Webster. A vertical SCANTLING, which see.

2. (Car Construction.) 60, FIGS. 360-72, 385-87. A short vertical wooden post in the side or end of a car between the window posts, or below the windows, extending from the side sills to the window sills.

3. A standing bolt, pin, boss or protuberance designed to hold an attached object in place, especially one formed of a headless bolt permanently screwed into a tapped hole in a casting or forging so as to become a part thereof. See, BRACKET STUDS. BRAKE BLOCK SUSPENDING STUD. ECCENTRIC LEVER STUD. SPRING STUD.

STUDENT LAMP. A lamp having a form of ARGAND BURNER, which see, connected by a feed tube with a removable reservoir having a valve at the bottom to permit the slow escape of the oil. The reservoir is so placed that the level of the oil is very near to the flame. The whole lamp slides up and down upon a standard.

STUFFING BOX (Air Pump). 95, FIGS. 893-94, and 36, FIG. 965.

STUFFING BOX NUT AND GLAND (Air Pump). 96, 97, FIGS. 893-94, and 37-38, FIG. 965. See, PISTON ROD PACKING GLAND.

SUB-CARLINE. (Refrigerator Car.) O, FIGS. 185-95. A carline under the main carline, supporting the sub-roof.

SUB-CENTER SILL. 6, FIGS. 246-50. An extra sill bolted under the center sill and running the length of the car.

SUB-FLOOR. 276, FIGS. 392-98.

SUB-FLOOR (Refrigerator Car). H., FIGS. 185-95. A layer of flooring under the main floor, and separated from it by an air space and hair felt.

SUB-ROOF (Refrigerator Car). M., FIGS. 185-95. The inside layer of the roof proper, supported on sub-carlines.

SUB-SILL. See, BUFFING SUB-SILL and BACK STOP TIMBER.

SUMMER STREET CAR. FIGS. 4736-38, 4753-54. See, STREET CAR.

SUMMER STREET CAR CURTAIN. FIG. 3714. A cloth, usually made of heavy canvas, to inclose open cars and exclude rain or sunshine.

SUPPLY PIPE. 1. (Air Pump.) A pipe through which the air enters the air pump. More commonly called air inlet.

2. (Lavatory Fittings.) 9, 11, 12, FIGS. 2798-2800. Pipes which carry water, hot or cold, to the faucets.

SUPPORT. "That which upholds, sustains or keeps from falling, as a prop, a pillar, a foundation of any kind." Webster. See, CYLINDER LEVER SUPPORT. PIPE SUPPORT.

SUSPENDING LINK. See, BRAKE BLOCK SUSPENDING LINK. SWING HANGER.

SUSPENDING PLATE. See, BRAKE BLOCK SUSPENDING PLATE.

SUSPENDING STUD. See, BRAKE BLOCK SUSPENDING STUD.

SUSPENSION. FIGS. 4778-81, 4888-90. The method of supporting a railway motor. Except in the case of gearless motors, the suspension is designed to put as little dead weight as possible on the axle.

SWAY BRACE. A term borrowed from the similar parts used in trestles to designate any form of diagonal bracing, but more especially timber planking spiked on the main timbers of a structure.

SWEEPING CAR, OR SWEEPER. A car with rotary brooms for sweeping snow from a railroad track. The brooms are attached to a horizontal shaft which is connected by suitable gearing with the axles, and the brooms are thus made to revolve. Used in cities, and chiefly on electric roads.

SWING BACK CAR SEAT. A car seat the back of which swings over the cushion, without reversing, top-to-bottom. It requires that both sides of the seat back be upholstered so that either side may be used. Such a seat back requires but one head roll.

SWING BEAM. See, SWING BOLSTER. SWING SPRING PLANK.

SWING BEAM FLITCH PLATES. See, FLITCH PLATES and SWING BEAM.

SWING BOLSTER. A truck bolster (so called in distinction from a rigid bolster) which bears on springs that are supported by a transverse timber called a spring plank, which is suspended by hangers or links so that it can swing laterally to the truck. As the springs rest on this plank and they support the bolster, the latter can swing with the spring plank. The object of providing this swinging motion to the bolster is to prevent, as much as possible, lateral blows and shocks from being communicated to the car body, and, vice versa, to prevent the momentum of the car body from acting with its full force on the truck. All passenger car trucks are swing bolster.

SWING BOLSTER SPRING. See, LATERAL MOTION SPRING.

SWING CABLES (Steam Shovel). 22, FIGS. 357-59.

SWING ENGINE (Steam Shovel). 24, FIGS. 357-59.

SWING GEAR (Steam Shovel). 23, FIGS. 357-59.

SWING HANGERS. 46, FIGS. 3781-3951, and FIGS. 3876-77. Bars or links attached at their upper ends to the transoms of a swing motion truck, by which the spring plank is suspended at their lower end so that it can swing laterally. Various forms are (1) solid bars with an eye at each end; (2) swing link hangers, made like a long link of a chain; (3) those made with a fork or clevis at one end and an eye at the other, FIGS. 3876-77, and used on passenger trucks; and (4) those made with a very short link attached to an eye bolt passing through the transom. These latter are called eye bolt link hangers.

SWING HANGER FRICTION BLOCK. 50, FIGS. 3781-3951 and FIGS. 3954-6. A casting or bearing of considerable diameter, on which the upper end of a swing link hanger rests. See, also, below.

SWING HANGER FRICTION WASHER (Lower and Upper). A cast iron chafing block serving no other purpose than to take the wear. It is only occasionally used. A friction block is almost synonymous, but is usually a larger casting.

SWING HANGER PIVOT (Lower and Upper) (Passenger Car Trucks). 47-8, FIGS. 3781-3951. An iron bar by which a swing hanger is suspended, or which supports a spring plank. The lower swing hanger pivot is more commonly called a cross bar or mandrel pin or axle, FIGS. 3878-80. The upper one is carried in a swing hanger pivot bearing attached to the transom.

SWING HANGER PIVOT BEARING. 49, FIGS. 3781-3951. See, above.

SWING HANGER SHAFT. A SWING HANGER PIVOT or CROSS BAR, which see.

SWING LINKS, etc. See, SWING HANGER.

SWING LINK HANGER. 46, FIGS. 3745-53, etc. A SWING HANGER, which see, made in the form of an open link.

SWING MOTION. A term applied to an arrangement of hangers and other supports for the springs and truck bolster which enables a car body to swing laterally on the truck. See, SWING BOLSTER. SWING HANGER.

SWING MOTION SPRING. 1. A BOLSTER SPRING, which see. 2. A lateral motion spring. 40, FIGS. 3781-3951.

SWING MOTION TRUCK. FIGS. 3745-53, 3781-3951. A truck with a bolster and spring plank suspended on swing hangers so that they can swing laterally to the truck frame. Also called swing bolster truck in distinction from a rigid bolster truck.

SWING SPRING PLANK. 43, FIGS. 3781-3951. A transverse timber underneath the bolster of a four wheeled truck, or the spring beam of a six wheeled truck, on which the bolster springs rest. A swing spring plank differs from an ordinary spring plank in being supported by hangers or links. See, SPRING PLANK.

SWINGING CIRCLE OR MAST WHEEL (Steam Shovel). 10, FIGS. 357-59. A large wheel at the foot of the mast or boom about which is wound a chain for revolving the boom.

SWINGING FIGUREHEAD (Steam Shovel). 25, FIGS. 357-59.

SWINGING PLATFORM (Pile Driver Car). A platform carrying the entire pile driving gear in such manner that it can be swung about at right angles to the car so as to project for a considerable distance on either side. It swings upon a center plate, and its movements are controlled by the SLEWING GEAR, which see. A cabin is almost always built upon it, and the floor is constructed with sills and end sills corresponding to those usually used in a car floor. Removable wings are sometimes provided to support the swinging platform when swung out in this manner. See, PILE DRIVER CAR.

SWINGING SASH. A window or blind sash which is hung and swings on hinges. See, DOOR CASE SASH (Street Cars). Otherwise rarely used.

SWITCHING. The act of moving cars from one track to another by means of switches, as in making up or separating trains, and placing the cars on the tracks and in the places where they are needed. Also occasionally called drilling or regulating, and in English shunting or marshaling.

SWITCHING EYE. More commonly PUSH POLE CORNER IRON or PUSH BLOCK, which see. A cast iron socket usually attached to the lower corner plate of a freight car, to which a push bar or push pole can be attached, to move the car by an engine on an adjoining track. A roping staple or pull iron is sometimes called a switching eye.

SWIVEL (of a Chain). A twisting link, consisting of a headed pin, entering into an eye or ring in an adjacent link. The object is to avoid kinking. Hence the term is applied to many forms of equivalent devices, consisting essentially of a ring surrounding a headed bolt in such manner as to permit rotation.

SYMINGTON DUST GUARD. FIGS. 4086-88. A dust guard made of a sheet of perforated steel, a sectional wooden ring and spring, making a joint against the dust guard wall and all around the axle, taking up ½ inch wear in diameter of the wooden ring.

SYMINGTON JOURNAL BOX. FIGS. 4100-1. A journal box with a machined joint on the lid and box and with a spring exerting its entire pressure in the center of the lid. The interior of the box is arranged to prevent settling and rolling of waste and to facilitate packing and maintenance.

T

T, OR TEE (Pipe Fittings). FIGS. 2279-80. A T-shaped cast iron tube for uniting one pipe at right angles to two others in the same line. The pipes are screwed

into the arms of the T. A REDUCING TEE, which see, has the arms of different diameters.

T-BOLT (English). See, SPRING LINK ADJUSTING SCREW.

T-HANGER. See, SPRING HANGER.

T-HINGE. FIG. 1960. A door hinge, one part of which is made like a strap hinge, and the other like a butt hinge, so that the shape of the whole resembles a letter T.

TABER BURNER. A burner similar to the dual, except that it has two wicks in one tube instead of a separate tube for each wick.

TABLE (Parlor and Sleeping Cars). 27, FIGS. 1778-80. A removable board attached to the side of the car by inserting a table hook fixed to the table into a table hook plate fixed to the side of the car. The inner end of the table is supported by a table leg, which is sometimes vertical and sometimes SLANTING, which see. The tables of DINING CARS, which see, are permanently fastened to the floor and sides of the car. A drop table is used in the kitchens of dining cars.

TABLE FASTENER. A latch by which a folding table is fastened up out of the way.

TABLE FURNISHINGS. FIGS. 3473-78.

TABLE HINGE. FIG. 1957. A hinge for a table.

TABLE HOLDER. FIGS. 3473-74. A special form of table hook. See, TABLE.

TABLE HOOK. 45, FIGS. 1778-83, and FIGS. 3475-77. See, TABLE.

TABLE PLATE. 46, FIGS. 1778-80, and FIG. 3478. See, TABLE.

TABLE LEG HOOK. FIG. 3472. A metal hook which is attached to a slanting table leg. It engages in a plate attached to the side of the car. See, SLANTING TABLE LEG.

TABLE LEG HOOK PLATE. See, SLANTING TABLE LEG.

TAG (Seal Lock). A loose label used chiefly in connection with seals. They are now often made of metal.

TAIL BOLT. See, DRAWBAR BOLT.

TAIL COUPLING (Alcove Faucet). FIG. 2752.

TAIL LAMP, OR TAIL LIGHT. FIGS. 2727-29. 1. A signal lamp attached to the rear end of a train. They are always carried on the platform, usually in pairs, and very commonly also at the side of the car so as to be visible from the engine. They are often of two or more colors.

2. (English.) A colored signal lamp carried at the rear end of the last vehicle of a train. See also, SIDE LAMP.

TANK. 1. (Passenger Cars.) 14, FIGS. 2798-2800. A water tank for the wash room.

2. (Gas Lighting Apparatus.) A, FIG. 2466. More properly RECEIVER, which see.

3. (Tank Car.) FIGS. 325-37. A boiler iron receptacle for oil, sometimes made of uniform diameter or straight, but generally made telescopic by slipping each successive ring inside the other, so as to bevel the tank toward the middle, to afford better drainage. It is held in place by tank bands, 107, FIGS. 325-37, fastened to tank band tie rods, F, on the top of a car to prevent the tank from turning. A tank dome, 108, is added at the top and dome heads, 109, are used to close the ends. A tank nozzle, 115, is used for emptying the oil, closed by a tank nozzle cap, 118, which latter is fastened to the nozzle by a tank nozzle cap chain. The oil is drawn off through the tank valve, 114.

4. (Westinghouse Brake.) The main reservoir.

TANK BAND. 107, FIGS. 325-37. See, TANK.

TANK BAND TIE ROD. F, FIGS. 325-37. See, TANK.

TANK CAR. FIGS. 67-68, 325-42. A car provided with a large TANK, which see, for carrying oil, acids, molasses, paraffine, and in fact all liquids transported in bulk. By far the greater number of tank cars are engaged in carrying crude and refined petroleum. Those used to carry the thicker oils, molasses and paraffine, are fitted with steam pipes, by which the contents may be melted or warmed to hasten its discharge.

TANK DOME. 108, FIGS. 325-37. See, TANK.

TANK HEAD. 106, FIGS. 325-37. See, TANK.

TANK HEAD BLOCK. E, FIGS. 325-37. A block securely bolted to the underframe transverse to the sills, at either end of the tank, to prevent any longitudinal motion of the tank with respect to the car. The block is shaped to fit the end of the tank.

TANK NOZZLE. 115, FIGS. 325-37. A short pipe used to empty the TANK, which see. It is usually cast in one piece with the TANK VALVE SEAT, which see.

TANK NOZZLE CAP. 118, FIGS. 325-37. See, TANK.

TANK NOZZLE CAP CHAIN. See, TANK.

TANK SADDLES. D, FIGS. 325-37. Floor distance blocks placed between the sills and curved to the contour of the tank; they support the tank slabbing, which in turn carries the tank.

TANK SLABBING. C, FIGS. 325-37. Longitudinal strips or filling pieces underneath the tank of a tank car, upon which the tank bears.

TANK STEP (Tank Car). A metal shelf or bracket fastened to the tank to facilitate access to the top of the dome.

TANK VALVE. 1. (Tank Car.) 114, FIGS. 325-37. A valve attached to the bottom of the tank to draw off the contents.

2. (Water Cooler.) A valve used with water tanks which extend to the roof, and sometimes with other smaller fixed tanks, for enabling them to be completely drained when desired. Also called water cooler valve.

TANK VALVE CAGE. 116, FIGS. 325-37. A metal inclosure, over the top of a tank valve, as a guide for it.

TANK VALVE ROD. 117, FIGS. 325-37. A rod for opening and closing a tank valve extending from the valve to the top of the dome.

TANK VALVE SEAT. 115, FIGS. 325-37. A metal plate, with one opening in it, closed by the valve. It is riveted to the under side of the tank and has a nozzle attached to it to which pipes are connected for conducting the oil.

TANK WASTE COCK SPIDER. FIG. 2761.

TAPPET PLATES (Air Pump). 20, FIG. 965.

TAPPET PLATE BOLT (Air Pump). 54, FIG. 965.

TARGET LAMP (Operator's). A SIGNAL LAMP, which see, used for attaching to fixed targets or semaphore signals. No special form of signal lamp is required or used for this purpose except that they be powerful and well constructed lamps.

TARPAULIN, OR WAGON SHEET (English). A piece of stout, flexible waterproof painted canvas, measuring about 20x12 ft., used to protect the contents of open freight cars (wagons) from the weather. Cords fastened to its edges are tied to SHEET RINGS (which see), by which it is firmly secured to the vehicle. It is largely used, as it saves much of the dead weight of a covered car, and gives good protection, except from theft.

TASSEL. See, WINDOW CURTAIN TASSEL.

TASSEL HOOK. See, WINDOW CURTAIN HOLDER. Tassels and tassel hooks are now rarely used.

TAYLOR'S INTERLOCKED AND WELDED STEEL TIRED WHEEL. FIGS. 4196-99.

TAYLOR'S MANGANESE STEEL WHEEL. FIGS. 4198-99. See, STEEL WHEEL.

TEAK. An oily, hard and most durable wood, raised in India. Largely used for ship building or other purposes requiring strength and exceptional durability. It has an oily, odorous sap, shrinks little, and does not corrode iron. Generally used for passenger car bodies in England and for wheels.

TEAK WOOD CENTER WHEEL. A form of steel tired wheel, in which triangular blocks of teak wood are used to connect the hub to the tire, which latter is attached to the wood by Mansell retaining rings. This wheel is

the standard for English passenger service, but it has been considered that it would not stand the dry American climate. See, WHEEL. CAR WHEEL. MANSELL WHEEL.

TEE. See, T.

TELEGRAPH COCK, OR FAUCET. FIGS. 2763-64. A self closing cock, the lever of which resembles the key of a telegraph instrument. See, LEVER FAUCET. When the water enters the cock horizontally they are called horizontal telegraph cocks, as FIGS. 2763-64. When it enters vertically they are called vertical telegraph cocks. See, FAUCET.

TELESCOPIC TANK (Tank Cars). See, TANK.

TENDER BRAKE (Air Brake). FIGS. 976-77. See, WESTINGHOUSE BRAKE. The tender brake gear does not differ essentially from that used under cars, except that the plain triple valve is used instead of the quick action triple valve.

TENDER BRAKE CYLINDER (Air Brake). FIG. 977. See, BRAKE CYLINDER.

TENDER BUFFER. The buffer used on locomotive tenders so as to meet the buffers on passenger cars equipped with the M. C. B. coupler.

TENDER DRAIN CUP (Air Brake). FIGS. 922 and 982-83. A larger cup than that used under cars. A chamber located in the train pipe containing an air strainer, and from which a branch pipe leads to the triple valve. A tender drain cup cock at the bottom is provided for removing the collected water.

TENON. The projecting end of a piece of timber fitted for insertion into a mortise by cutting away a portion on one or more sides. Sometimes the tenon is made cylindrical. Tenons are secured in their mortises by pins or by giving them a DOVE TAIL, which see.

TENSION BAR. Any bar subjected to a tensile strain. The upper member of an iron body bolster is called the tension bar.

TENSION MEMBER (of a Frame, Truss, Beam or Girder). Truss rods, brake rods, etc., are tension members in distinction from COMPRESSION MEMBERS, which see.

TENSION ROD (of a Derrick or Crane). A horizontal stay connecting the top of the mast and boom. It is of fixed length in a crane and of adjustable length in a derrick. See, DERRICK.

TENSION ROD CLEVIS (of a Derrick or Crane). A CLEVIS, which see, sometimes carried at the upper end of a boom, to which the tension rod connecting the boom and mast is attached.

TERRA COTTA STORAGE HEATER SYSTEM (Gold's). FIGS. 2326, 2352. A system of steam heating using direct steam, in which the radiators are large iron cylinders filled with terra cotta bricks. Steam is admitted into these cylinders and heats the bricks, which give off heat after the car is cut out at stations and other like points.

TEXODERM. An artificial leather used for curtains and upholstering. It is made by coating a cloth fabric with a compound which gives it the appearance of leather.

THEATRE SEATS (Dining Cars). An ordinary double car seat having two separate seat bottoms which can be raised up into a vertical position in the manner usual in theatres, in order to make the inner seats more easy of access.

THERMOSTATIC STEAM TRAP (Gold's Car Heating). FIG. 2355-84, 2394. A device to regulate the escape of steam in proportion to the condensation that has taken place. It consists of a cast iron shell or body with an inlet at the left and outlet at the bottom. In front of the inlet is a hollow brass diaphragm, shown, partly filled with an expansive fluid, adjusted and kept in place by lugs round the sides of the trap body by a regulating spring, and the set screw, seen in the cover. When cold the trap is always open, and the diaphragm, as in position shown, but as live steam is forced into the trap and comes in contact with the diaphragm, it immediately expands, and meeting the composition disc seat, closes the trap and prevents the waste of steam. As condensation proceeds and the water cools, the diaphragm gradually contracts and allows it to pass off through the outlet.

THIMBLE. 1. A bushing.

2. A sleeve or tube through which a bolt passes, and which may act as a distance piece. A thimble is usually round, but sometimes square, as smoke pipe thimble. See,

AXLE SAFETY BEARING THIMBLE. BODY BOLSTER THIMBLE. BUFFER THIMBLE. BRAKE SHAFT THIMBLE.

3. (Janney Platform). A small casting in which the point of the catch lever rests.

THIRD CLASS CARRIAGE (English). A car which performs much the same functions as an American so-called "first class" passenger car, since it carries 89½ per cent. of the passengers, but very dissimilar in arrangement, weight and size. It generally weighs about 20,000 lbs., and is carried on four or six wheels, divided into five compartments, and seats fifty passengers. The seats and backs are comfortably shaped and upholstered in rep, stuffed with horsehair. Sofa springs and carpets are usually omitted, but parcel nets and shades are provided. The comfort of this class of carriage has been very much improved of late years, but the interior finish is considerably inferior to that of ordinary American cars, the interior being generally painted and grained.

THIRD RAIL SHOE. FIGS. 4827, 4878, 4874. A metallic sliding contact, usually of cast iron, mounted on the car truck, and insulated therefrom, for collecting current from an insulated third rail located alongside the running rails. Positive contact between shoe and rail is maintained by gravity or by a stiff spring. Four shoes are usually used for a double truck car, each being carried on a wooden beam, supported by the truck journal boxes.

THORNBURG DRAFT GEAR. FIGS. 1197-1214. A spring gear made in twin and tandem forms the distinguishing feature of which is the use of interlocking box followers, shown in FIGS. 1197-1202.

THREAD. See, SCREW THREAD.

THREE PIPE MANIFOLD. 85ab, FIG. 2291. A pipe fitting forming a return bend for three pipes instead of two.

THREE-WAY BATTERY SWITCH (Gould Electric Light). FIGS. 2624-26.

THREE WAY COCK (Westinghouse Brake). A cock formerly used on the locomotive for applying and releasing the brakes. It has been supplanted by the ENGINEER'S BRAKE VALVE, FIGS. 907-09, which see.

THREE WHEELED HAND CAR. A light hand car with two wheels on one rail, somewhat like a velocipede, and a third wheel on the opposite rail merely to steady the vehicle. They are worked either with levers operated by the hands, or by treadles with the feet, or by both hands and feet. See, HAND CAR.

THREE WIRE SYSTEM OF ELECTRIC CAR LIGHTING. FIG. 2622. See, GOULD ELECTRIC CAR LIGHTING SYSTEM.

THRESHOLD, OR THRESHOLD PLATE. 1. (Passenger Cars.) A DOOR SILL, which see.

2. (Of a Vestibule.) The plate which covers the buffer plate and connects it with the platform forming an adjustable threshold for the end door, etc.

THROAT (of a Car Wheel). The interior angle of a flange where it joins the thread of the wheel. See, FLANGE.

THROAT PIECE (Snow Plow Framing). (Side, Center and Intermediate Throat Pieces.) The curved ribs connecting the inclined plane of the plow, with the deck, being curved they give a projection to the deck, which lessens the tendency of the snow to ride over the top of the plow.

THROTTLE VALVE. An angle globe valve (i. e., one having the entrance and exit pipes at right angles to each other) attached to the locomotive for admitting steam to and shutting it off from the air pump. Called a steam valve.

THROUGH BODY BOLT (English). Nearest American equivalent, sill and plate rod. A bolt passing vertically through the body and securing the various parts of the sides or ends together.

THUMB PIECE. A general term applied to many forms of lugs or projections for moving springs, catches, or other movable mechanical parts.

THUMB SCREW. A screw with two projecting flat sided flanges adapted to be turned with the finger and thumb.

TIE. "A beam or rod which secures parts together and is subjected to a tensile strain. It is the opposite of a strut or straining piece, which acts to keep objects apart, and is subject to compressing force."—Knight.

TIE BAR. A bar which acts as a tie. See, DRAFT TIMBER TIE BAR. PEDESTAL TIE BAR. PEDESTAL BRACE TIE BAR. TRANSOM TIE BAR.

TIE BOLT (Janney Coupler). A long bolt passing through the end sill and holding on the buffer beam outside of the platform end timber.

TIE PLATE. 1. A MAIN CARLINE, which see.

2. (Iron Frame Car.) Flat plates riveted to the top flange of the iron sills, usually over the bolsters and sometimes between them, to connect the sills together and serve the same purpose as the floor timber distance blocks and sill tie rod, with wooden sills.

TIE ROD. A rod which acts as a tie. See,

BODY COUNTERBRACE TIE ROD. GIRTH TIE ROD.
BRAKE BLOCK TIE ROD. LEVER FRAME TIE ROD.
CYLINDER LEVER TIE ROD. PLATFORM TIE ROD.
END BRACE TIE ROD. SAFETY BEAM TIE ROD.
END GIRTH TIE ROD. SILL TIE ROD.
WHEEL PIECE TIE ROD.

TIE TIMBER. See, CROSS FRAME TIE TIMBER.

TIFFANY REFRIGERATOR CAR. An ice and salt car belonging to the class of cars having the ice supply on the roof.

TIMBER WAGON (English). A short four wheeled flat car with a swiveling bolster, chains, posts, etc., adapted to carry timber in the log, which rests on two or three timber wagons coupled together.

TIN CAR ROOF. A roof consisting of a layer of boards resting on the rafters and running lengthwise to the car, covered with tin plates, the edges of which are soldered together. Used on passenger cars, and a somewhat similar roof of galvanized iron is the Excelsior galvanized car roof made for freight cars, FIGS. 1743-7.

TIP. An ornamental knob on the end of a rod. More commonly called acorn. See, BASKET RACK TIP. BERTH CURTAIN ROD TIP.

TIP CAR. FIGS. 49, 51-53. A car constructed so that its body can be tipped to allow its contents to slide out. Often also called a dump car. They are usually four wheeled, rarely eight wheeled. A style of four wheeled tip car, which is slowly tipped by gearing, which winds a chain, has gained considerable favor on the Boston & Albany Railroad.

Cars which are tipped by compressed air have been introduced and received with considerable favor. The advantages secured by the use of air are that cars may all be dumped at once and the bodies restored to their normal positions; they may be dumped while in motion, and they are all under the control of the man on the locomotive. The dumping and restoring of car body is effected by two train pipes, provided with an auxiliary reservoir, and the dumping is effected in much the same way that the brakes are applied under the Westinghouse system. Mine cars are frequently tip cars.

TIRE. A heavy hoop or band of iron or (usually) steel forming the ring or periphery of a wheel to impart strength to it and to resist wear. In this country car wheels are generally cast, but within a few years steel tired wheels have come into general use for passenger service. They have been universal in European practice, and many devices for fastening them securely to the wheel have been devised. See, TIRE FASTENING.

In England the word is usually spelled tyre. The name is supposed to come from the fact that iron bands were first used on wheels in the city of Tyre, Syria.

TIRE BOLT. A screw bolt for holding a tire on a wheel center. When retaining rings are used the bolts pass through the rings and hold them and the center and tire together.

TIRE FASTENING. FIGS. 4225-37 show the principal methods. The Mansell fastening, shown in FIGS. 4227, 4231, 4237, etc., is the mode of securing the tire to the wheel which becomes operative when the shrinkage of the tire alone is insufficient to prevent the latter leaving the wheel. The Mansell retaining rings, FIGS. 4227, 4231, etc.; the Gibson fastening, FIGS. 4225, etc.; the Boies tire lock, FIGS. 4168, etc., are quite common. See, CAR WHEELS and WHEELS.

TOE (of a Car Wheel Flange). The extreme outer point where the wheel has the largest diameter.

TOE NAIL. A nail driven in obliquely to fasten the end of a board or other piece of timber to the surface of another. The stick so fastened is said to be toed, or toe nailed.

TOGGLE ARMS. The two arms of a toggle joint, which form a strut between the two opposite hopper doors, holding them closed.

TOGGLE JOINT. "An elbow joint; a joint between two bars articulating endwise, as the human knee."—Knight.

TOILET. Another name for a saloon.

TONGS, OR CRABS (Pile Driver and Wrecking Cars). A device for anchoring the body of the car to the track when in use. A jack screw is used in connection with the tongs to raise the body of the car, so as to bring a strain upon the tongs. See, BOLSTER JACK SCREW, which is a different device for the same purpose.

TOOL BOX. 1. FIGS. 63, 66. A box very frequently placed under the body of the car, especially in caboose, derrick or wrecking cars, for carrying tools and supplies.

2. T, FIGS. 388-91. A rectangular wooden box with a glass front, in which are kept tools to be used in case of accident. It usually contains an axe, a saw, a sledge and a bar. A ground glass front is sometimes used.

TOOL CAR. A box car arranged for carrying all kinds of tools, ropes, etc., which are used, in case of accident to trains on the road, in replacing or removing the cars or engines on or from the track. Such cars are often used when any heavy objects are to be moved, as is necessary in erecting bridges, etc.

Tool cars are often fitted up with sleeping berths for workmen. A tool car usually serves as a tender for every wrecking car.

TOP ARCH BAR. More properly, simply ARCH BAR, which see.

TOP CHORD (of a Truss). The upper outside member of a truss, especially one divided up into panels. The members of mere trussed beams are not commonly designated as chords.

TOP DOOR RAIL. 149, FIGS. 388-91, etc., and 4, FIGS. 1026-31. The uppermost horizontal bar or piece of a door frame.

TOP DOOR TRACK. 65, FIGS. 159-69. See, DOOR TRACK.

TOP HEAD (Air Pump). 47, FIG. 965; 60, FIGS. 893-94. The top cylinder head of the pump together with the valve seats, valves, etc.

TOP LIGHT RAIL (English). A part of the body framing of a carriage forming the top of the window opening.

TOP NUT (Engineer's Valve). 7, FIGS. 907-09.

TOP PANEL BATTEN (English). American equivalent, fur-

ring. A part of the body framing to stiffen the top panel, which is pinned to it.

TOP PLATE (Metal Body Bolster). 12a, FIGS. 159-69, 223-26, 271-95, etc. See, BODY BOLSTER.

TOP RAIL (of door). See, TOP DOOR RAIL.

TOP RAIL. A name applied sometimes to the plate of a street car.

TOP RAIL FILLING STRIP. See, FILLING PIECE.

TOP RESERVOIR JOURNAL BOX. A journal box having a reservoir for oil or grease above the journal, from which the oil flows to the journal. Rarely used in this country, but common in Europe, with either oil or some form of grease as a lubricant.

TOP SIDE BEARING. A body side bearing. See, SIDE BEARING.

TOP SIDE RAIL (Coal Car). The horizontal piece of timber which forms the top of the side. A similar part in roofed cars is called the plate.

TORCH AND KEY (Pintsch System). FIG. 2528. A special device combining the ordinary wax taper torch, and a key, fitted to handle the cock of any Pintsch lamp, as well as to open or close the globe of any lamp from the floor of the car.

TORNADO CANOPY VENTILATOR. FIG. 3486. See, VENTILATORS.

TORNADO LAMP. A general term applied to lamps which receive their supply of air through a long tube, usually connected with the supports or arms of the lamp, so as to check the effect of sudden gusts of wind. Hurricane lamp is another name for the same thing.

TORPEDO. A cylindrical detonating cap provided with clips for folding under the head of the rail for the purpose of making a loud alarm as a signal on the passage of engines over them. The basis of the detonating compound is fulminate of mercury. The interior pieces of iron, to insure the explosion of the fulminate, are termed anvils. Some torpedoes have three anvils. A torpedo with spring clips has been introduced for attaching to the track from the rear end of a train in motion by means of a patented carrier to be held in the hands of the trainman, which insures that the torpedo will not escape except to clasp the head of the rail. The same device is also used to attach blue lights to the track, burning for a fixed length of time.

TORPEDO VENTILATOR. FIG. 3499. See, VENTILATORS.

TORSION PROOF CAR ROOFING. FIGS. 1771-74. A construction for freight car roofs with sheets sliding into subrafters.

TOURIST CAR. FIGS. 110-111. 1. A car roughly built and furnished for the transportation of men alone, such as bodies of troops, parties of excursionists, emigrants, etc. Frequently they are flat or box cars furnished with roof sides, seats and doors. The emigrant sleeping car is now usually called a tourist car, the latter being preferred by those who patronize them.

2. A private car, one of several, of elaborate finish and luxurious appointments, chartered by excursionists who are making a tour of the country.

TOURIST SLEEPING CAR. FIGS. 110-111, 126, 131, 366-67. A sleeping car plainly finished, sometimes upholstered in rattan, for accommodation of travelers who cannot afford the comforts of the so-called palace sleeping car.

TOWEL RACK. FIG. 2790, etc. A tray for holding clean towels.

TOWEL ROD. FIGS. 2825, 2861-64. A rod with brackets or bushings at the ends upon which towels may be hung.

TOWEL ROD BRACKETS. FIGS. 2825-42, etc. See, TOWEL ROD.

TOWEL ROLLER BRACKET. FIGS. 2830, 2839-42. A bracket for supporting a towel roller. There are two, the fixed end and loose end bracket. The principal supply of towels, however, is usually carried in a towel rack or hung on towel rods.

TOWER COUPLER (Freight). FIGS. 1311-70. (Passenger). FIGS. 1505-13.

TRACK. 1. A rail or bar which forms a path on which anything, as a car or door, runs. Sliding doors have usually two door tracks, bottom and top door track.

2. (Pile Driver Car.) A circular track upon which the rollers of the swinging platform travel. A rack is connected with it as a part of the slewing gear.

TRACK AND WHEELS, TERMS AND GAGING POINTS. FIG. 4367. See, WHEELS AND TRACK.

TRACK LAYING CAR. 1. A low push car, primarily for carrying rails short distances in construction. They are frequently without a floor or platform and are provided with fixed rollers at the side for running the rails forward.

2. A platform car with a cantilever truss extending out from one end of the car over the track and on which rails may be run out and distributed on the ties.

TRACK SWEEPER. FIG. 4742. A SWEEPING CAR, which see. For city use only.

TRAIN BRAKE PIPE. See, BRAKE PIPE.

TRAIN CAR. A CABOOSE CAR, which see.

TRAIN PIPE. (Train Brake Pipe.) See, BRAKE PIPE. The later and preferable name is train brake pipe.

TRAIN PIPE VALVE AND THERMOSTATIC STEAM TRAP (Gold's Car Heating). FIGS. 2355-56. A train pipe valve is a combination of valves, cocks and steam traps, by means of which the steam supply from car to car is controlled from the interior of each car, thereby simplifying the application of any system of equipment for steam heat from the locomotive. See, THERMOSTATIC STEAM TRAP.

TRAIN SIGNAL LAMP. FIGS. 2726-29. A lamp attached to a car as a signal, usually to the last car on a train, and commonly called a tail light. See, SIGNAL LAMP. They are usually some form of lantern. Lanterns of ordinary form, but with red globes, are also used.

TRAIN SIGNAL PIPE. See, SIGNAL PIPE.

TRAIN SIGNAL STOP COCK. A stop cock in the signal pipe. There is one at each end of a car.

TRAIN SIGNALING APPARATUS. FIG. 958. A substitute for the bell cord arranged to give train signals by compressed air. A separate line of signal pipe, similar to the brake pipe, extends throughout the train, connected between the cars by hose and couplings. A car discharge valve, connected to this signal pipe, is located in each car and attached to the bell cord in such manner that pulling on the cord releases air from the signal pipe. On the engine is a signal valve, which is also connected with the main signal pipe and a small signal whistle. The supply of air is received from the main reservoir through a reducing valve, which maintains a pressure of about 40 lbs. per square inch in the signal apparatus.

When the car discharge valve is opened, by pulling on the cord, the diaphragm in the signal valve is operated so as to blow the whistle. Signals can be given in this way with rapidity and great certainty. If the train breaks in two the whistle is blown loudly for a considerable time.

TRANSFER TABLE. A platform and section of track on wheels, its length being equal to the length of a car. Its chief use is to transfer cars from one section of a shop to another, connecting with parallel tracks and running transversely to them.

TRANSOM. 1. Primarily, a cross piece.

2. (Carpentry.) A horizontal piece framed across a door or double light window. The term is also applied in the general sense of a cross piece in other ways.

3. (Car Building, Swing Bolster Trucks.) 20, FIGS. 3735-3951, and FIGS. 3809-12. One of two horizontal cross beams attached to the side frames, between which the swing bolster is placed. They are usually made of wood, but recently they have been made of iron. They are used in some forms of truck, which are not swing

motion. See also, MIDDLE TRANSOM. OUTSIDE TRANSOM (Six Wheel Trucks, 3948-51).

4. The body bolster is also sometimes called a transom or body transom, but incorrectly. The term body transom is more properly limited, when used at all, to the CROSS FRAME TIE TIMBER or NEEDLE BEAM, which see.

5. A word frequently used in street car work as an adjective, for the word "deck," and meaning that the part belongs to the upper deck windows or to the clear story.

6. (English.) Commonly spelled TRANSOME, which see.

TRANSOME (English). A CROSS FRAME TIE TIMBER or NEEDLE BEAM, which see. More commonly called cross bearer, which latter term is also in use in this country.

TRANSOM BEARING BLOCK. A piece of wood or iron placed on top of a transom, under the attachment or bearing of a swing hanger, to raise it up higher.

TRANSOM CASTING. 28, FIGS. 3735-3951. A casting attached to a truck frame, and to which the end of one or both of the transoms are fastened.

TRANSOM CHAFING PLATE. 27, FIGS. 3781-3951. A plate attached to the side of a transom to prevent it from abrasion.

TRANSOM CORNER PLATE (Passenger Trucks). 131, FIGS. 3781-3951, and FIGS. 3799-3801. See, TRUCK FRAME CORNER PLATE.

TRANSOM AND END PIECE TIE ROD. FIGS. 3851, 3885. A rod extending through the transom and end piece to stiffen the truck frame.

TRANSOM MUNTIN OR MULLION. See, MULLION.

TRANSOM OPENER. FIG. 3507. A device for opening a transom over a door; very similar to a deck sash opener.

TRANSOM PILLAR (Diamond Trucks). 29, FIGS. 3735-3951. A small casting acting as a distance piece between the transom and inverted arch bar.

TRANSOM PLATE. FIGS. 3858-61. Iron plates on both sides of wooden transoms of passenger trucks.

TRANSOM SASH STOP. FIG. 3573.

TRANSOM TIE BAR. 23, FIGS. 3781-3951. A wrought iron bar bolted to a pair of transoms, sometimes above and sometimes below, to hold them together.

TRANSOM TRUSS BLOCK. 25, FIGS. 3781-3951. See, TRANSOM TRUSS ROD.

TRANSOM TRUSS ROD. 24, FIGS. 3781-3951; FIGS. 3841-42, 3884. Transverse rods attached at their ends to the wheel pieces, which extend alongside the transoms and are inclined downward under a central transom truss block, so as to strengthen the transoms. Generally, two such rods are used with each truck. In the Pullman trucks a transom plate is used with a straight transom tie rod.

TRANSOM TRUSS ROD SEAT. A bearing for the transom truss rod on the under side of the transom.

TRANSOM TRUSS ROD WASHER. 26, FIGS. 3781-3951; FIGS. 3794-5. See, WASHER.

TRANSVERSE FLOOR TIMBERS (Street Cars). Timbers which extend across the car underneath the floor, and on which the latter rests. They are used only when there are two sills. Not to be confused with cross frame tie timbers, which are under the sills.

TRANSVERSE FLOOR TIMBER PLATE. A wrought iron or steel plate to strengthen the transverse floor timber and act as a tie rod for the floor timber braces.

TRANSVERSE RISING TIMBER. See, RISING TIMBER.

TRANSVERSE TIE ROD (English). American equivalent, sill tie rod. A long rod which serves to bind together the underframe transversely.

TRAP. See, STEAM TRAP.

TRAP (for Refrigerator Car). An S-shaped pipe, largely used in all forms of plumbing work for permitting the exit of water, while preventing the entrance of air.

TRAP COCK (Consolidated Car Heating). FIGS. 2308-9. The trap cock is an asbestos packed cock, in which the plug has an opening of the proper size to regulate the flow of water from a car. It takes the place of the trap in the commingler system, the use of the trap itself having been abandoned.

TRAP DOOR. 1. A door in a floor or roof, closing flush therewith when shut. See also, PLATFORM TRAP DOOR.

2. (Pullman Extended Vestibule.) A door which covers the platform steps and makes a continuous level floor for the full width of the car in an extended vestibule.

3. A door of a street car in the floor which gives access to the motor and gearing between it and the axle.

TRAP VALVE (Consolidated Car Heating). FIG. 2296. This trap valve is designed to take the place of the thermostatic trap. It gives an adjustable opening for the discharge of water from the heating apparatus. It also leaves the apparatus so that it can be entirely closed off so as to prevent the water from flowing from the heating apparatus.

TRAVERSING JACK. FIG. 2973. A jack that can be moved horizontally on a bed or track while under its load.

TREAD. 1. (Of a Step.) The part on which the foot is placed. See, TREAD BOARD. RUBBER TREAD.

2. (Of a Car Wheel.) FIG. 4370. The exterior cylindrical surface of a car wheel inside of the flange which comes in contact with the rail. The usual width is about 4 in., measured from the throat or inside of the flange, and about 5½ in. out to out measurement, from outside of flange to outside of wheel. The standard section adopted by the M. B. Association in 1886 is shown in FIG. 4370.

TREAD BOARD (of a Step). 46, FIGS. 360-72. The horizontal part on which the foot is placed. Usually covered with rubber or metal safety treads to prevent slipping. See FIGS. 723-4.

TRIANGULAR WASHER. An iron plate or block, the cross section of which is triangular, and which forms a bearing for the nut or head of an inclined brace rod. Also called beveled washer, but the latter term is chiefly used when the angle between the two faces is small.

TRI-COMPO, OR TRI-COMPOSITE CARRIAGE (English). A composite coach in which separate compartments for first, second and third class passengers are provided.

TRIGGER. See, SASH LOCK TRIGGER.

TRIMMING CAP. A CAR SEAT MOLDING, which see. FIGS. 3268-79.

TRIPLE BRAKE. FIGS. 825-26. Brakes for six wheel truck.

TRIPLE COUPLING LINK. A kind of chain used with the draw hooks of English draw gear. Used in America for small four wheeled coal cars only.

TRIPLE VALVE (Air Brake). FIGS, 910, 913, 959-62, 966. 1. A valve device consisting of a body or case, called the triple valve body, which has connections to the train pipe, the auxiliary reservoir and the brake cylinder, in which a slide valve is operated by a piston, so that when the pressure of the air in the train pipe is increased the auxiliary reservoir is charged and the air in the brake cylinder is released to the atmosphere; and so that, when the air pressure in the train pipe is reduced, air from the auxiliary reservoir is discharged into the brake cylinder for applying the brakes. A triple valve performing only these functions is now known as the plain triple valve.

2. The quick acting triple valve has all the features and performs all the functions of the plain triple valve, and has the additional function of causing a discharge of air from the train pipe to the brake cylinder, when, in emergencies, the maximum force of the brakes is instantly required.

3. (For Freight Air Brake Gear.) FIGS. 918-19. A special form, not differing in principle from the passenger brake valve, but generally combined with the reser-

voir and brake cylinder in one single part for economy and convenience of attachment.

TRIPLE VALVE BODY. 125, FIGS. 959-62.

TRIPLE VALVE BRACKET AND NIPPLE (Air Brake). FIGS. 926-27, 978; 14, FIG. 966. A four legged standard in the nature of a distance piece, to which the triple valve is attached.

TRIPLE VALVE BRANCH PIPE (Air Brake). A short pipe by which the triple valve is connected with the brake pipe.

TRIPLE VALVE GASKET. 15, FIGS. 918-19. A gasket placed in the joint between the triple valve and the brake cylinder.

TRIPLE VALVE PISTON (Air Brake). 4, FIG. 910; 5, FIG. 913. See, TRIPLE VALVE.

TRIPLE VALVE RUBBER SEAT. 20, FIGS. 959-62.

TRIPOD. 1. A three legged stand.

2. (For Lamp Shade.) A cheap substitute for a shade ring.

TROJAN CAR COUPLER. FIGS. 1483-99. One of the M. C. B. types.

TROLLEY (Street Car). A small wheel, or a carriage with journal, bearings, case, etc., usually attached to the end of a trolley pole, the latter being attached, pivoted and swiveled to the top of a street car, and so stayed by springs that it tends to stand in a vertical position. This tendency of the trolley pole to stand erect keeps the trolley wheel in contact (on the under side), of an electric conductor stretched above the car over the center of the car tracks. Electric motor cars which drive the electric current through a trolley are called "Trolley Cars." The majority of electric motor cars in use at the present time are "trolley cars," taking the current from an overhead conductor.

TROLLEY BASE. FIG. 4873. A swivel base placed on the roof of an electric car for the support of the trolley pole; strong springs preserve a firm contact between the trolley wheel and wire.

TROLLEY BOARD (Street Car). A board or several boards making a long, narrow platform (very much like a running board of a freight car), to which the trolley pole is attached, and on which inspectors and repair men may stand. The boards rest upon trolley board cleats. Trolley base blocks are fastened to the trolley boards, and the trolley pole is fastened to the base blocks.

TROLLEY CORD. FIG. 1823. An extra heavy cord, by which the trolley is handled from the platform.

TROLLEY HARP. FIG. 4864. A clevis shaped metallic frame at the end of the trolley pole for holding the trolley wheel. Also called trolley fork.

TROLLEY WHEEL. FIGS. 4867-70. A deeply grooved metal wheel mounted on a trolley pole for collecting current from an overhead wire.

TRUCK. 1. "A small wheel; hence trucks, a low carriage for carrying goods, stone, etc., either on common roads or on railroads. Indeed, this kind of carriage is often called a truck, in the singular."—Webster. The term is applied to different kinds of small vehicles used on and about stations for handling freight and baggage by hand, sometimes in a confused sense. The usage seems to be increasing, however, to speak of baggage barrows and freight trucks, although both are sometimes designated as barrow trucks. Four wheeled vehicles, called baggage wagon trucks and freight wagon trucks, are also used. Vehicles of this class are also designated as warehouse trucks. Special varieties are the telescope, swing barrel and self loading trucks. Many others exist, in limited use.

2. FIGS. 3729-4056, 4896-4911. A car truck, which is, mechanically, a small four wheel (or sometimes six wheel) car, under each end of an American car body, and carrying the latter as a dead load by means of two swiveling center plates connected by a center pin or king bolt. The purpose of the truck is to enable short wheel bases to be used in connection with long car bodies. See, CAR TRUCK.

Passenger car trucks are nearly always of wood in combination with iron flitch plates, truss rods, etc. For freight car trucks wood has almost passed out of use, except for the transoms, truck bolsters and spring planks, and iron is being rapidly substituted for the latter as well. Even when wood is employed it is frequently strengthened by iron or steel plates. Wooden brake beams are the exception. For spring planks, transoms and bolsters the common structural forms of channels and I beams are used.

TRUCK BOLSTER. 30, FIGS. 3735-3951, and FIGS. 4057-81. A cross timber or beam in the center of a truck, to which the lower center plate is fastened, and on which the car body rests. The truck bolster is connected to the body bolster by a center pin, which passes through it.

For the price allowed for trucks by the rules for interchange of traffic see, INTERCHANGE OF TRAFFIC and FREIGHT CARS. See also,

CONTINUOUS FRAME TRUCK.
RIGID BOLSTER TRUCK.
SWING MOTION TRUCK.
PAIR OF TRUCKS.

3. (English.) American equivalent, freight car. This term is never used in England in the American sense, the word bogie being used instead. Truck has precisely the same meaning and application as WAGON, which see. See, CARRIAGE TRUCK.

TRUCK BOLSTER CHAFING PLATE (Passenger Trucks). 36, FIGS. 3735-3951. A plate attached to a swing bolster to protect it from wear.

TRUCK BOLSTER FLITCH PLATES. See, BOLSTER FLITCH PLATES.

TRUCK BOLSTER GUIDE BARS (Diamond Trucks). 37, FIGS. 3735-3951. More commonly called columns. Cast iron posts between the arch bars, held in place by column bolts, which form a guide for the end of the bolster. These columns are sometimes also required to perform the office of brake hanger carrier, as in FIGS. 3745-53. An offset shoulder is cast on the column near the top and on the inside with a jaw, to which the brake hanger is fastened by a brake pin, 87, FIGS. 3745-53.

TRUCK BOLSTER GUIDE BLOCK. A cast iron shoe for the end of a truck bolster, which slides vertically between the columns or bolster guide bars. They are used only in connection with the latter. See above.

TRUCK BOLSTER TRUSS BLOCK. See, TRUSS BLOCK.

TRUCK BOLSTER TRUSS ROD (Rigid Bolster Trucks). A rod attached near the ends of a wooden truck bolster. In swing bolster trucks, rods of a similar nature are used, and termed transom truss rods.

TRUCK CENTER BEARING TRUSS. FIGS. 4038-39; 66, FIGS. 3948-51. The combination of the CENTER BEARING ARCH BAR and CENTER BEARING INVERTED ARCH BARS, which see.

TRUCK CENTER PLATE. 63, FIGS. 3735-3951, and FIGS. 3796-8. See, CENTER PLATE.

TRUCK CHECK CHAIN EYE. 70, FIGS. 3781-3951. See, CHECK CHAIN. A body check chain eye is also used.

TRUCK CHECK CHAIN HOOK. 69, FIGS. 3781-3951. A hook on the end of a check chain.

TRUCK DETAILS. FIGS. 3784-3935, 3952-4237.

TRUCK END PIECE. 17, FIGS. 3781-3951. See, END PIECE.

TRUCK FRAME. A structure composed of wooden beams or iron bars, to which the journal boxes or pedestals, springs and other loose parts are attached, and which forms the skeleton of a truck.

TRUCK FRAME CORNER PLATE. 130, 131, FIGS. 3781-3951. A malleable iron or pressed steel plate bolted to the corners of a wooden truck frame to keep it stiff and rigid. They take the place of KNEE IRONS, which see below.

TRUCK FRAME KNEE IRON (Passenger Car Trucks). 81, FIGS. 3781-3951. An interior angle plate of cast or wrought iron to connect the truck frame together.

TRUCK KNEE IRON. See, TRUCK FRAME KNEE IRON.

TRUCK SIDE. A TRUCK SIDE FRAME, which see.

TRUCK SIDE BEARING. 61, FIGS. 3735-3951. A plate, block or roller or spring plate attached to the top of the truck bolster, on which a corresponding bearing fastened to the body bolster rests. Their purpose is to prevent the car body from having too much rocking or rolling motion. They are made of various forms, such as a plain metal plate, to protect a wooden bolster from wear, a cup shaped casting to hold oil or grease and waste, and various forms of rollers, rockers, studs, spring cases and the like.

TRUCK SIDE FRAME. The longitudinal portion of a truck frame, on the outside of the wheels, which extends from one axle to the other, and to which the journal boxes and bolsters or transoms are attached. See, DIAMOND TRUCK SIDE FRAME, in designating which the term is chiefly employed.

TRUCK SUB-SILL. A sub-sill bolted to the side sill of a street car which bears upon the truck frame, to which it is bolted.

TRUNNION. The pivot upon which any body, as a gun, revolves. The term is usually applied to bearings for objects of irregular shape, and having slow or irregular motion, as distinguished from the journals, of wheels, etc.

TRUSS. A frame to which rigidity is given by uniting the parts so that its figure shall be in effect cut up into triangles, making it incapable of distortion by turning of the bars about their joints. The simplest form of truss is that in which a truss rod and king post are put underneath a beam to strengthen it, or two beams are framed together in the form of a letter A, and tied together at their lower ends by a rod or another beam. These are called king post trusses. Another form is that in which two posts are used, which are called queen post trusses. This is not a perfect truss, since it is capable of altering its shape by simply bending without rupturing its parts, when unequally loaded. In order to prevent this counter braces should be added. This is the usual way of trussing the under frame of cars. The sills resist bending and act as straining beams, thus preventing great distortion. The usual forms of trusses used for the side framing of cars are the Pratt and the Howe types. In the former all the braces are subject to tension, and in the latter the braces are compression members. The Pratt truss is rarely used alone to-day for side trussing, but is often used in combination with the Howe truss. The Howe truss is rarely used in its simple form, being usually provided with vertical posts alongside of the vertical tension members. The side of a car is not a perfect truss as ordinarily built, for the middle panel, which contains the door, lacks the essential elements of braces or counter braces. Long cars are reinforced with heavy trusses of the bridge or roof type, and further strengthened by body truss rods.

The CHALLENDER TRUSS, which see, is a kind of plate girder. See, GIRDER. See also, BASTARD HOWE. BASTARD PRATT. FRAMING. BUNK TRUSS (of Logging Cars).

TRUSS BLOCK. A distance piece between a truss rod and the compression member of a trussed beam, which forms a bearing for both. See, BODY BOLSTER TRUSS BLOCK. TRANSOM TRUSS BLOCK. TRUCK BOLSTER TRUSS BLOCK.

TRUSS PLANK (Passenger Frames). 63, FIGS. 343-48, 360-72, 385-87, 388-91, and 1, FIG. 1782. A wide piece of timber bolted to, and sometimes locked into, the posts on the inside of the car immediately above the sills.

A substitute for the truss plank and body truss rod is the CHALLENDER TRUSS, which see. The end truss plank is a continuation of the latter across the ends of the car, for uniformity of finish.

TRUSS PLANK CAP. A strip of wood attached to the top of a truss plank between the seat frames.

TRUSS ROD. An inclined rod used in connection with a king or queen post truss, or trussed beam, to resist deflection. It is attached to the ends of the beam, and is supported in the middle by a king post, truss block, or two queen posts between the beam and the rod. A substitute for the body truss rod, as well as for the truss plank and body brace rods of an ordinary car frame, is the CHALLENDER TRUSS, which see.

TRUSS ROD ANCHOR IRON. 24, FIGS. 360-72, etc.; FIGS. 701-4. A wrought iron strap with lugs and a turn at the end which engage with the iron body bolster and in recesses cut into the side sill, to which it is bolted. It serves as an anchor to attach the ends of the body truss rods to the side sills.

TRUSS ROD BEARING. A bearing used to furnish support to a truss rod, at an angle or bend in the latter, as

BODY TRUSS ROD BEARING. ROD BEARING.
TRUCK BOLSTER TRUSS
BODY BOLSTER TRUSS ROD BEARING.

The bearing over the bolster of a long body truss rod running from end sill to end sill is called a body truss rod saddle, probably in part from its form. A distinction has been attempted between a truss rod bearing and a truss rod saddle, founded upon the direction of the strain which it resists, and this distinction has been preserved in this edition. It cannot, however, be said to be founded on usage, either of bridge builders or car builders, except in respect to the body truss rod saddle, as above stated.

TRUSS ROD IRON. 24, FIGS. 360-72. A bar of iron, having an eye, to which a body truss rod is attached, bolted to the under side of a sill below a body bolster. It is a form of attaching body truss rods almost out of use for freight cars, but in common use on passenger cars. A truss rod anchor iron.

TRUSS ROD QUEEN POST. See, TRUSS ROD and QUEEN POST.

TRUSS ROD SADDLE. See, TRUSS ROD BEARING and BODY TRUSS ROD SADDLE, 20, FIGS. 159-69, etc.

TRUSS ROD WASHER. FIGS. 461-2, 469-70. A large flat or beveled washer, used under a nut on the end of a truss rod. Sometimes called a skew back. See, BODY BOLSTER TRUSS ROD WASHER. TRUCK BOLSTER TRUSS ROD WASHER.

TRUSSED BRAKE BEAM. FIGS. 832-37, etc. Many brake beams in use to-day are trussed beams. The usual method is to use a truss rod from end to end of the beam with a king post in the middle.

TUBULAR CAR. A form of car construction, introduced some years ago, in which the sills and floor framing are built of iron gas pipe. A small number of these cars have been built and are in service under leases on the smaller roads. They were built at a time when the demands upon cars were rapidly increasing, and they were not equal to the burdens and rough treatment to which they were subjected. They grew in disfavor owing to the fact that the repairs were expensive and arduous, as well as the difficulties attending the repair of distorted parts. Few, if any, have been built lately.

TUBULAR LANTERN. A lantern having no guards except a rectangular frame of tubes, through which the air supply is also carried. They are in two forms, with shade reflector and square or side reflector.

TUFTING BUTTON. FIGS. 2896-2905. A button used in upholstery to hold the cord which passes through the upper covering of the upholstered surface, dividing it up into squares or diamonds.

TUMBLER. 1. A drinking glass.

2. (Foundry.) A machine for cleaning castings, locomotive tubes, etc. It consists of a case mounted on a shaft, on which it is made to revolve. The articles inside of the case are cleaned by their attrition against each other and the case.

3. (Locksmithing.) "A latch engaging within a notch in a lock, bolt, or otherwise, opposing its motion until it is lifted or arranged by the key so as to remove the obstacle."—Knight.

TUMBLER HOLDER. FIGS. 2777-83. A bracket or stand for holding glass tumblers or drinking cups. They are either single or double.

TUMBLER HOLDER AND DRIP. FIG. 2753. A water cooler drip, the top of which is made large enough to hold a glass.

TURNBUCKLE. FIG. 2968. A device inserted in the middle of a long rod for changing its length. Right and left screw turnbuckles, FIG. 2968, or single screw turnbuckles are the most common; pipe or tube turnbuckles are rarely used.

A form that has gained much favor for use on cars is that shown in FIG. 2968. They are made the following sizes, and larger in proportion:

SIZE. D.	A.	B.	C.	L.
1 inch	6 in.	1½ in.	9 in.	25 in.
1⅛ "	6 "	1 11-16 "	9⅜ "	25 "
1¼ "	6 "	1⅞ "	9¼ "	26 "
1⅜ "	6 "	2 1-16 "	10⅛ "	27 "
1½ "	6 "	2¼ "	10½ "	27 "
1⅝ "	6 "	2 7-16 "	10⅞ "	28 "
1¾ "	6 "	2⅝ "	11¼ "	28 "

D. Size=Outside Diameter of Screw.

A. Length in Clear between head=6 in. first length for all sizes.

B. Length of Tapped Heads=1½ D.

C. Total Length of Buckle without Bolt Ends

L. Total Length of Buckle and Stub Ends when open.

The letters refer to dimensions shown in FIG. 2968.

TURN UNDER (English). See, FALL UNDER.

TURTLE BACK ROOF. A roof for a passenger car which is arched, but without a clear story or upper deck. It is the prevailing roof for English carriages, but has not found favor in this country, its use being confined chiefly to a few coaches on the Boston & Albany Railroad.

TWIN CAR SEAT. FIGS. 3171-72, etc. A seat stand with a division arm, two cushions, two seat backs with two striker arms each, so that they may be turned so as to bring the occupants face to face.

TWIN DOOR PANELS. 10, FIGS. 1029-31. A pair of panels side by side in a door, formed by inserting a parting rail into a wide panel.

TWIN HOPPER GONDOLA CAR. FIGS. 21, 23, 26, 37, 296-7, etc. A gondola car with two hoppers, the centers of which are about 10 feet apart. This type of gondola has been adopted to get a long flat bottomed car that will discharge its contents with the least amount of shoveling. The car may also be used for long timber. See, GONDOLA.

TWIN WASHER. A DOUBLE WASHER, which see.

TWIST GAGE FOR NEW COUPLERS. FIGS. 4659-63. In 1899 a twist gage for new couplers, as shown, to be used so as to insure that the heads are neither twisted nor displaced sidewise with relation to shank, was adopted as Recommended Practice.

TWISTED FLAT WIRE (for Car Seals). FIGS. 3133-34. A form adapted to prevent the possibility of the lead seal being stripped from the wire and afterward replaced upon it. See, CAR SEALS.

TWO LIGHT CENTER LAMP. See, CENTER LAMP and CHANDELIER. The majority of center lamps are two light burners.

TYRE (of a Wheel). See, TIRE. The spelling "tyre" is the English method, and corresponds with the supposed origin of the word, which is from the fact that iron bands were first used on wheels in the city of Tyre, Syria.

U

U-BOLT. A double bolt made of a bar of iron, bent in the shape of the letter U, with a nut and screw on each end. See, BRAKE HANGER CARRIER. STAKE POCKET U-BOLT.

UMBRELLA HOLDER AND POCKET. FIGS. 2956-57. A bracket with oval holes, put up in a horizontal position with the pocket a suitable distance below it. The umbrella is thrust through the bracket, the end resting in the pocket below.

UNCOUPLING ATTACHMENTS (M. C. B. Recommended Practice). In 1897 a committee reported on uncoupling arrangements for M. C. B. couplers, submitting designs shown in FIGS. 4507-28, which were subsequently adopted as Recommended Practice of the Association.

The report of the committee, also adopted, contained the following reference to these designs:

"Diagram No. 1 shows the application of the proposed standard parts to a car with concealed end sills with the parts of the dimensions and located as shown on 'Plate B, Recommended Practice for Attaching Automatic Couplers to Cars,' arranged to operate the lock in a coupler having the lock located on the vertical center line of the coupler.

"Diagram No. 2 shows the application to the same design of car with the center of the lock located three inches from the vertical center line of the coupler. Within these limits are located the locks on the great majority of couplers in service.

"Diagram No. 3 shows the application to a car having projecting end sills. The bracket supporting the end of the release rod farthest from the coupler is provided with a projection to enable the lock of the coupler to be held in the raised position by pushing the rod toward the center of the car, after being raised, until the outer arm engages the projection, a feature which with many designs of couplers is necessary.

"The dimensions of the parts as shown will be suitable for all cars with dead blocks of the dimensions as shown on 'Plate B, Recommended Practice,' and with end sills 8 or 9 inches in depth; for cars with these parts of different depths the proper adjustment can be made by changing the relation of the arms of the lever to bring the center of the eye of the horizontal arm to the proper height above the eye of the lock or by the use of links of different lengths.

"There are some designs of M. C. B. couplers in use in which the lock is operated from the side or from beneath. As each type has a distinctive method of operating the lock, your committee did not think it necessary to consider them in this report, although some such types are used in considerable quantities."

UNCOUPLING CHAIN. See below.

UNCOUPLING LEVER (Freight Cars). 210, FIGS. 159-69. An uncoupling lever and rod usually attached to the end sill by which the lock of the M. C. B. coupler is opened and the cars uncoupled without going between them. The lever and rod is in various forms, as the form of lock may require.

UNCOUPLING ROD. 210, FIGS. 159-69, 271-95, etc.; and 173, FIGS. 388-91. A rod connecting the uncoupling lever with the lock of an automatic coupler. On freight cars it is forged in one piece with the lever. FIGS. 650-52.

UNCOUPLING SHAFT (Passenger Cars). 173, FIGS. 388-91.

UNCOUPLING SHAFT BRACKET. FIGS. 446-8, 509-13. A bracket supporting the uncoupling shaft on the end of the car.

UNDERFRAME. A stout framework, which receives the buffing and pulling stresses and carries the weight of the floor and body of the vehicle. In both freight and passenger cars in America the underframe and body are rigidly connected and mutually stiffen and strengthen one another, but in English carriages the

body is framed as an independent structure, and merely rests on the underframe, rubber pads (india rubber body cushions) being interposed to deaden shocks. The only connection is through a BODY HOLDING DOWN BOLT, which see. Underframe includes all the framing below the floor, and includes the platforms, draft timbers, etc. Many cars have been built with pressed steel underframes and structural steel underframes. FIGS. 758-59.

UNDERFRAME PLATE (English). See, SPIDER PLATE.

UNDER HUNG DOOR. A sliding door which is supported and slides on a rail below the door. Over hung doors are preferred.

UNION (Pipe Fittings). A UNION JOINT, which see.

UNION JOINT (Pipe Fittings). A means of uniting the ends of two pipes with a nut. The latter is attached to one pipe with a collar, and is screwed on the opposite pipe, or on a thimble attached to the pipe. Often called simply a union or coupling. They are largely used for all forms of pipe work, and take their distinctive names, if any, from the parts with which they are connected, as drain pipe union, reservoir union, etc., of Westinghouse brake.

UNITED STATES STANDARD SYSTEM OF SCREW THREADS. This term is often used to designate the SELLERS SYSTEM OF SCREW THREADS, which see.

UNIVERSAL JOINT. 1. "A device for connecting the ends of two shafts so as to allow them to have perfect freedom of motion in every direction within certain defined limits."—Knight. An application in car building which has not yet secured general use as a substitute for brake hose, in connection with air brake and steam apparatus.

UPHOLSTERY. In passenger car construction, the cushions, curtains, carpets, beds, etc., and generally the materials from which they are made.

UPPER BEARING. See, SWING LINK HANGER.

UPPER BELT RAIL (Passenger Car Exteriors). 82, FIGS. 388-91. A horizontal bar attached to the posts on the outside and above the windows.

UPPER BERTH. 2, FIGS. 1778-83. The top berth in a sleeping car section. It folds up by day against the roof, being secured by a berth latch or safety berth latch, having a pocket above it in which the head board, two thin mattresses and the bedding are stored. See, BERTH.

UPPER BERTH BRACKET. FIG. 3395. A form of upper berth rest closely resembling a bracket.

UPPER BERTH POCKET. A pocket against the sides of the car which closed up flush therewith when the upper berth was folded up, but dropped open when the berth was made up, so as to afford a receptacle for clothing and baggage. It has been replaced by a hammock. Similar pockets for the lower berth are made by turning up the head rest of the seat.

UPPER BERTH REST (Sleeping Cars). FIG. 3395. A metal lug, or shelf, which supports an upper berth when lowered.

UPPER BERTH REST PIVOT. FIG. 3423. A pin attached to a plate fastened to an upper berth. The pin engages in a hole in a BERTH REST, which see.

UPPER BOLSTER PLATE. 12a, FIGS. 159-69, etc. Should read body bolster top plate. See, BODY BOLSTER.

UPPER BRAKE SHAFT BEARING. 96, FIGS. 159-69, 271-95, and 156, FIGS. 388-91; FIGS. 493-6. An eye by which the upper end of a brake shaft is held in place. In passenger and street cars, usually attached to the hand rail; on freight box cars, when the brakes are operated from the roof, to the end of the body near the top.

UPPER CORNER PLATE. FIGS. 561-2. See, CORNER PLATE.

UPPER DECK (Passenger Cars). 110, FIGS. 360-72, etc. Also called clear story. The raised central portion of the roof. See, DECK.

UPPER DECK BOTTOM RAIL (Street Car). The deck sill or sill of a clear story.

UPPER DECK CARLINE. 118, FIGS. 360-72, 385-87, 388-91. CARLINES, which see, passing from side to side of the upper deck only, resting on the deck plate. Usually called simply deck carline.

UPPER DECK EAVES MOLDING. A molding, usually called simply deck eaves molding, on the outside edge of the roof.

UPPER DECK FURRING STRIP. See, FURRING.

UPPER DIAPHRAGM (Pintsch Lamp). 287, FIGS. 2605-21.

UPPER DISCHARGE VALVE (Air Pump). 44, 45, FIG. 965. A poppet valve at the top of the air pump cylinder through which the compressed air above the piston passes.

UPPER DOOR SASH. 12, FIGS. 1029-31. The part of a double window sash in a car door which covers the upper part of the opening. This upper section is usually made movable, so that it can be lowered for ventilation.

UPPER END PANEL (Street Cars). See, PANEL.

UPPER FLOOR (Stock Car). 28, FIGS. 219-22. More commonly double deck.

UPPER INTERMEDIATE VALVE SEAT AND CHAMBER (Air Pump). 42, 43, FIG. 965.

UPPER RAIL (Sliding Doors). Usually called top door rail. A guide rail above doors which are supported upon rollers at the bottom, or one carrying a door suspended upon door hangers. See, DOOR RAIL.

UPPER RECEIVING VALVE (Air Pump). 41, FIG. 965.

UPPER SEAT BACK RAIL. See, SEAT BACK.

UPPER SWING HANGER PIVOT. 47, FIGS. 3781-3951. See also, LOWER SWING HANGER PIVOT.

UPPER WAINSCOT END RAIL (Passenger Car Interiors). See below.

UPPER WAINSCOT RAIL. 75, FIGS. 388-91, and E, FIG. 1781. A longitudinal wooden bar or rail, fastetned to the posts immediately under the window. See, WAINSCOT RAIL.

UPPER WINDOW BLIND. See, WINDOW BLIND.

UPPER WINDOW BLIND LIFT. FIGS. 3593-94, etc. Distinguished from a lower window blind lift in not having a lug or ledge. See, WINDOW BLIND LIFT.

URINAL. FIGS. 3110-14. A metal or porcelain receptacle used in saloons, connected to a pipe leading through the floor. They are distinguished as corner or side urinals, the former almost invariably used in car work. A CONCEALING URINAL, which see, shutting up flush with the wood work when not in use, is sometimes used.

URINAL COVER. A wooden or sheet metal lid for inclosing a urinal.

URINAL DRIP, OR DRIP PAN. A pan under a urinal on the floor.

URINAL HANDLE. FIGS. 3097-3102. A handle in a saloon, placed above the urinal to hold on to. They are distinguished as corner or side urinal handles, according to their position on the side of the car.

URINAL PIPE. See, URINAL.

URINAL VENTILATOR. A pipe attached to a cap on a urinal, communicating with the top of a car, where some form of wind scoop is often added.

V

V-SHAPED SCREW THREAD. A thread with a sharp edge at the top and sharp groove at the root. The Sellers (U. S.) standard thread is flat at the top and at the root, and the Whitworth is rounded at those points. V-threads are now used chiefly for pipe threads.

VACUUM BRAKE. A system of continuous brakes which is operated by exhausting the air from some appliance under each car by which the pressure of the external air is transmitted to the brake levers and shoes. So

called in distinction from AIR BRAKES, which see, which are technically understood to refer only to brakes operating with compressed air, although in a literal sense the vacuum brake is also an air brake. An ejector on the engine is ordinarily used for exhausting the air, connected with the rest of the train by pipes and flexible hose between the cars. Now little used.

VALANCE. A term applied to the tasselated decorations of windows and which cover and conceal the shade roller and curtain holder. B, FIG. 1781.

VALVE. A lid, cover, or plug for opening and closing an aperture or passage.

VALVE BODY. The shell case or frame of a valve. See, TRIPLE VALVES. 2, FIGS. 910, 913. ENGINEER'S VALVE, 2, FIGS. 907-09.

VALVE KEY (Pintsch Gas Lighting Apparatus). FIGS. 2512-13. A key for opening all the high pressure valves, the lamp key, FIG. 2513, being used for the low pressure valves connected with the burners.

VALVE PISTON (Reducing Valve). 4, FIG. 952.

VALVE SEAT. "The flat or conical surface on which a valve rests."—Knight. See, DISCHARGE VALVE SEAT. TANK VALVE SEAT.

VALVE STEM. A rod attached to a valve, and by which the latter is moved, is always called a valve stem.

VAN (English). A comprehensive term for any covered vehicle not used for conveying ordinary passengers or ordinary freight. See, BRAKE VAN. BULLION VAN. GUARD'S VAN.

VANDERBILT BRAKE BEAM. FIGS. 854-59, 863-67. A brake beam made of a 5 in. I beam, not trussed. One type has the ends cut out to permit the removal of the fulcrum without removing the brake shoe heads. The beam shown in FIGS. 863-67 is a trussed beam, using a channel for compression member. The parts are self locking, and no rivets are used.

VANDERBILT HOPPER CAR. FIGS. 42, 308-11. A hopper car built entirely of steel with only two sills, of 15 in. channels, which are in the center of the car. The side plates are reinforced to form a plate girder and carry a large part of the load.

VANDERBILT TANK CAR. FIGS. 68, 338-42. A tank car with steel under frame, made up of two I beams placed well under the sides of the car as sills. Short channels are used as center sills for the attachment of draft gear, extending from the end sill back to the bolster.

VANDERBILT TRUCK. FIGS. 3765-67. A form of arch bar truck using channels for the compression members of the truss. It is fitted with ROCKER SIDE BEARINGS, which see.

VAN DYKE TANK CAR. FIG. 67. A type of tank car in which the tank is supported on saddles over each truck. No sills are used, the bottom tank plate being made extra heavy, and the draft gear riveted to it.

VARNISH. A "liquid glass" for covering paint or wood work. See, FINISHING VARNISH.

VELOCIPEDE CAR. Generally a three wheeled car, in which the rider sits astride and propels the car with his feet (or feet and hands together), after the manner of a velocipede. They comprise a variety of light cars for inspectors, telegraph line repairers, lamp lighters, etc.

VENEER. "A thin leaf of a superior wood for overlaying an inferior wood."—Webster. By trade usage it is a veneer if it covers other materials than inferior wood. Thus in the Spurr veneers and wood carvings, FIGS. 2923-26, the material covered is a matrix resembling papier mache. It may be in relief, resembling wood carvings. See, CEILING VENEERS. PERFORATED VENEERS.

VENT. "A small aperture; a hole or passage for air or other fluid to escape."—Webster. See, LAMP VENT.

VENT VALVE (Triple Valve). 71, FIGS. 959-62. (Engineer's Valve.) 180, FIGS. 968-71.

VENT VALVE PISTON SEAT AND SPRING (Triple Valves). 129-32, FIGS. 959-62.

VENTILATED BOX CAR. FIGS. 7, 208-11. A box car with grated doors and screened openings called ventilators, through which the air can circulate freely. Used chiefly for fruit. See, FRUIT CAR.

VENTILATING CHIMNEY (Pintsch Lamp). 324, FIGS. 2605-21.

VENTILATING JACK (for Saloons). Also called wind scoop. A flaring horizontal tube, constituting a simple form of the ventilating devices which use the current produced by the motion of the cars to cause an exhaust current of air. See, WIND SCOOP. INJECTOR, etc.

VENTILATOR. 1. FIGS. 3483-3503. A device for admitting or exhausting air to or from a car. Ventilators, according to their position, are designated as deck ventilators (end or side), end ventilators, frieze ventilators, etc. They are often designated as automatic or self acting. The prominent forms of the latter varieties are shown in FIGS. 3483-99.

Day coaches usually depend upon the deck windows for ventilation, the sash at every other window being hung on different sides, so that the open sash may be hinged on the front end. Sash openers for deck sash hinged in this manner are shown in FIGS. 3504-15. For a report of tests with the various ventilators shown see Proceedings M. C. B. Association, 1894, page 234.

2. (For Fruit Car.) FIG. 7, 208-11. A system of slats protected by netting at each end of the car, so arranged as to enable the ventilators to be readily opened or closed from the outside.

VENTILATOR ARM. A small attachment carried on deck sashes, especially of street cars, for holding them open.

VENTILATOR CASING (Street Car). The casing of the side ventilators, or deck windows, which takes the ventilator sash, or to which the wire screen is fastened.

VENTILATOR COWL (English). See, VENTILATOR HOOD.

VENTILATOR DEFLECTOR. A metal plate or board placed in such a position at a ventilator opening that it will cause a current of air to flow into or out of the car when the latter is in motion. Another form, used in windows to produce an exhaust draft when opened, is a mere loose board with a notch to receive the lower edge of the window sash, FIGS. 3695-98. See, DEFLECTOR.

VENTILATOR DOOR. A door for closing the aperture of a ventilator. See also, VENTILATOR VALVE.

VENTILATOR FIXED PANEL (English). The outer panel in a ventilator composed of two perforated panels, one being capable of being slid over the other so that the perforations coincide or become covered. This form of ventilator is used in English cars to the exclusion of any other. See also, VENTILATOR HOOD and VENTILATOR SLIDING PANEL.

VENTILATOR HOOD. 1. A shield over the outside of a ventilator to prevent the entrance of sparks, cinders, rain or snow. It is sometimes intended to direct the current of air either into or out of the car. See also, DECK END VENTILATOR HOOD.

2. (English.) Also called ventilator cowl. A shield made of either wood or metal, preventing the entrance of rain or cinders.

VENTILATOR NETTING. 1. A wire screen or netting fastened over the outer deck window sash to prevent the entrance of sparks, cinders and dust.

2. A netting over the ventilator windows of a fruit car.

VENTILATOR OPENER. See, DECK SASH OPENER. FIGS. 3504-15.

VENTILATOR PANEL. A panel in the frame of a valve or door for closing the aperture of a ventilator.

VENTILATOR PIVOT. A pin on which a ventilator door or sash is swung or hinged. It is the same as a deck sash pivot, FIGS. 3528-34.

VENTILATOR PIVOT PLATE. The same as a sash lock plate or stop, FIGS. 3558-61, etc.

VENTILATOR PLATE. See, FRIEZE VENTILATOR PLATE.

VENTILATOR REGISTER. A metal plate or frame attached to a ventilator opening, provided with slats arranged so as to turn, and thus either open or close the ventilator. They are chiefly used as frieze ventilators, but sometimes elsewhere. In sleeping cars they are sometimes combined with berth curtain rod brackets.

VENTILATOR SASH. Usually a deck sash.

VENTILATOR SASH PIVOT. A deck sash pivot.

VENTILATOR SLIDING PANEL (English). Part of a ventilator in which there are two perforated hardwood slides, the outer fixed, the inner movable, so as to make the perforations coincide or be covered. See, VENTILATOR HOOD and VENTILATOR FIXED PANEL.

VENTILATOR STAFF. FIGS. 3546-50. A PULL HOOK or DECK SASH OPENER, which see.

VENTILATOR STOP (Street Car). A small metal bracket on which a ventilator sash rests when open.

VENTILATOR VALVE. A door for opening or closing the aperture of a ventilator, usually made to turn on pivots at or near its center. See, DECK SASH PIVOT.

VERTICAL EQUALIZING LEVER. 25, FIGS. 1784-86. (Pullman Vestibule.) A vertical lever, one end of which bears against an overhead face plate buffing spring (called an overhead equalizer spring) and the other end against the horizontal equalizing lever, the middle of which is pivoted by a bracket attached to a longitudinal plate or bar that abuts against the body end plate. The object of these vertical equalizing levers is to get the horizontal equalizer lever high enough to give head room in the vestibule for the dome lamp, etc.

VERTICAL STEAM TRAP AND BLOW OFF (Gold's Car Heating). FIG. 2389. A THERMOSTATIC STEAM TRAP, which see, and a blow off valve combined. It may be operated from inside of the car.

VERTICAL TELEGRAPH COCK, OR FAUCET. See, TELEGRAPH COCK.

VESTIBULE. 1. (Of a Car.) Formerly that part of the car nearest the door, cut off from the main saloon by an interior door. It was occupied by the saloon, washing and heating arrangements, etc. Its purpose was to give protection to the interior of the car against drafts and noise.

2. FIGS. 1784-94; details, FIGS. 1795-1809. Usually a platform enclosure, consisting of a face or buffer plate, constituting an arched doorway, connected with a spring extended rod, a foot plate combined with the buffer stems and face plate, a bellows-like connection called a diaphragm between the face plate and car frame and side doors opening to the steps. The successful application of the vestibule to cars was first accomplished by the Pullman Company. It was patented April 29, 1887, by H. H. Sessions, and assigned to the Pullman Co. It claimed the invention of "the combination with the end of a railway car of a frame plate or equivalent series of buffers backed by springs, arranged with its face in a vertical plane and normally projecting beyond the end of the car, whereby, upon the coupling of two cars, a spring buffer will be interposed between the superstructures of such adjacent cars above their platforms, and also frictional surface opposing spring pressures to prevent the racking of the car frames upon sudden stoppages and to oppose the tendency of the cars to sway laterally (oscillate) when in motion," so arranged and adjusted that "when the two cars were coupled the faces of the buffers will bear against each other in contact under pressure."

The courts have upheld the validity of the patent on the grounds that "the device possessed patentable novelty and utility." The claims sustained were those of "frictional contact of the face plates under constantly opposing spring pressure, which diminished the shock to the superstructure in collisions and resisted the forces tending to create oscillation." The frame plate of the original vestibule was to have longitudinal motion, but no lateral motion except with the car body. The use of the canopy feature was old, for it had been in use for more than twenty years in England, Russia and the United States.

VESTIBULE BODY CORNER POST. The inner post of a vestibule, set against the end of the car body and directly over the platform sills.

VESTIBULE BUFFER PLATE. Y, FIGS. 388-91. An extra long and wide buffer plate, recessed or chamferred at the ends to take the face plate of the vestibule, whose face is flush with the buffer plate.

VESTIBULE DOME LAMP. FIG. 2571, etc. A lamp specially designed for vestibules.

VESTIBULE DOOR. FIGS. 1032-33, and 7, FIGS. 1784-86. A door by which the vestibule of a car is entered from the side. In the older type of vestibule they are double or divided, the two doors being hinged together and to the vestibule corner post.

VESTIBULE DOOR BOLT OR LATCH. FIGS. 1908-09. See, DOOR BOLT.

VESTIBULE DOOR HINGE. 1. Strap hinges, FIGS. 1958-59, which fasten the double doors of a vestibule together.
2. For rabbeted doors, FIG. 1964.

VESTIBULE DOOR LATCH. FIGS. 1989-94. A door latch specially designed for vestibule doors.

VESTIBULE DOOR ROD. FIGS. 3021-23. A bar or rod across the vestibule doors to prevent their being pushed in.

VESTIBULE END CARLINE. A platform hood end carline.

VESTIBULE (COMPOSITE) END POST. The end post of a vestibule, resting upon the platform end sill. In the Pullman, FIGS. 1784-86, it is a composite end post composed of an iron bar or angle bar bent at the ends and bolted to the platform and platform hood end carline. It is stiffened with wood bolted to the sides of the bar or angle bar.

VESTIBULE END WINDOW. 11, FIGS. 1784-86. The window in the end of the vestibule enclosure.

VESTIBULE FACE PLATE. X, FIGS. 388-91. An inverted U-shaped forging about the side of a door frame arched at the top, and forming a passage way from the platform of one car to that of the next. The weight of it is carried on the buffer plate; it is kept thrust out against the opposing face plate either by springs, as in the Pullman vestibule, or by its own weight, as in the Barr and Gould vestibules.

VESTIBULE GATE (Pullman). FIGS. 1806-07. A gate to the arched doorway, leading from the platform of one car to that of the next car.

VESTIBULE HOOD. 19, FIGS. 1784-86. A platform hood.

VESTIBULE LAMPS. FIG. 2571, etc. See, PINTSCH LAMPS.

VESTIBULE PLATFORM TRIMMINGS. FIGS. 3017-18.

"VIENNA" LAMP SHADE. FIG. 2675. See, LAMP SHADE.

VULCANIZED FIBER. A leathery material of great durability and toughness, which is made by subjecting various kinds of vegetable fiber to the action of acids. It is insoluble in all ordinary solvents, such as oil, alcohol, ether, ammonia, etc. It is made in two classes, hard or flexible (the former being that used generally in car construction for the dust guards of journal boxes), and in sheets from 16 to 24 in. wide by about 50 in. long, and from 1-32 in. to ¾ in. thick. Another name for the same article is gelatinized fiber.

W

WAGON, or GOODS WAGON (English). American equivalent, freight car. A vehicle (usually four wheeled) used to convey any sort of merchandise, minerals or live stock, and run in freight trains. Truck is a synonymous term largely used.

See, BALLAST WAGON.* HIGH SIDED WAGON.*
BATTEN WAGON.* LOW SIDED WAGON.*

BOILER WAGON.* MEDIUM SIDED WAGON.*
BOX WAGON. OPEN WAGON.*
CATTLE WAGON. RAIL WAGON.*
COVERED WAGON. TIMBER WAGON.*
GOODS WAGON.

Wagons marked thus * are open wagons (gondola cars) having no roof.

WAGON COUPLING, or DRAW CHAIN (English). The draft coupling universally used on freight cars (goods wagons) in England in connection with a DRAW HOOK, which see.

WAGON SHEET (English). See, TARPAULIN.

WAGON TRUCK. A four wheeled vehicle for moving baggage or freight about a station or warehouse.

WAGON WHEEL (English). See, WROUGHT IRON WHEEL. STEEL TIRED WHEEL.

WAINSCOT PANEL. 76, FIGS. 388-91 and 12, FIGS. 1778-83. A board which forms a panel under the windows between the two wainscot rails.

WAINSCOT RAILS (Passenger Car Interiors). 74, 75, FIGS. 388-391. Longitudinal wooden strips fastened to the posts and extending from one end of the car to the other. The lower wainscot rail comes immediately above the truss plank; the upper wainscot rail is immediately under the window. The wainscot end rails are the wainscot rails at the end of the car.

WAIST PANEL (English). The panel immediately above the lowest panel on the outside of a carriage body.

WAIST RAIL (English). A horizontal piece in the framing of the side of a passenger carriage.

"WALKOVER" CAR SEAT. FIGS. 3153-56. A swing back car seat made by Hale & Kilburn.

WALL LAMP. FIGS. 2568, 2652, etc. A lamp to fit in a recess in the wall of a car or corridor.

WALL SEAT END. The seat end next to the wall or side of a car, so called in distinction from the aisle seat end.

WALL SOCKET CASTING. 8, FIGS. 3151-52. A casting bolted or otherwise fastened to the inside end of seat to which the striker arms are pivoted and in which the mechanism that tilts the cushion is placed; the seat end connecting rail is also fastened to this casting.

WARDS (of a Lock). The interior circular ridges which fit into corresponding recesses in the bit of a key (the latter also termed wards), the surrounding solid parts of the bit being called the web.

WAREHOUSE TRUCK. A small vehicle which is used for moving freight about a warehouse. See, BARROW TRUCK. WAGON TRUCK.

WASH BASIN. FIGS. 2802-05. The metallic wash bowl of a folding lavatory.

WASH BOWL, or WASH BASIN. 1, FIGS. 2798-2800. A BASIN, which see. They are used in sleeping and drawing room cars, and generally form a part of a fixed wash stand.

WASH BOWL PIPE. A waste pipe.

WASH ROOM. A lavatory. A compartment which constitutes the vestibule of ordinary parlor and sleeping cars, provided with toilet facilities. In private and officers' cars it is placed in various irregular positions to leave the ends of the car free. Wash rooms with pumps and water tanks underneath the wash bowls are being replaced on Pullman cars by what is known as the Pullman compressed air system of water supply, FIGS. 2806-19. See, LAVATORY.

WASH ROOM FURNISHINGS. FIGS. 2749-2887.

WASH ROOM PUMP. More properly BASIN PUMP, which see. They are either single or double acting.

WASH STAND (Postal Cars). A cast stand carrying a basin. They are distinguished as corner or side wash stands.

WASH STAND SINK. A cast iron plate with one or more bowls, made in one piece and lined with porcelain and used for the top of a wash stand. Used only in second class cars.

WASH STAND SLAB. 2, FIGS. 2798-2800. A stone or metal slab which forms the top for a wash stand. Commonly, simply slab.

WASHBURN COUPLER (Freight). FIGS. 1404-06 (Passenger), FIG. 1502.

WASHBURN WHEEL. 1. A cast iron car wheel, designed and patented by Nathan Washburn in 1850. It consists of two plates, which extend from the hub to about half the distance between it and the rim. There they unite into one plate, which extends to the rim. The plates are all curved so as to contract when the wheels are cooled without danger of fracturing the wheel. The single plate and the rim are united together and strengthened by curved ribs cast on the inside of the wheel. See, CHILLED CAST IRON WHEEL.

2 (Steel Tired Wheels). Wheels having a cast iron centre and steel tire shrunk on. FIGS. 4184-86.

WASHER. 1. A plate of metal or other material, usually annular, which is placed under a nut or bolt head to give it a better bearing. Two or more washers are sometimes combined and called washer plates, strap washers, double or twin washers, triple washers, etc.; they are sometimes made beveled or triangular for a rod or bolt which is oblique with reference to the bearing surface. A socket washer or flush washer is one provided with a recess for the bolt head, so as to leave it flush with the surface of the adjoining parts. Cut washers or wrought washers are those stamped out of rolled iron plates. Cast washers are made from cast iron. Both are largely used. Washers in car work all take their name from that of the bolt or rod to which they are attached, except the base washer, which stands at the base of the platform posts on passenger car platforms. A GASKET, which see, is sometimes called a washer.

2. A brush for washing objects, as car washer, FIGS. 2961-65.

WASHER PLATE. A STRAP WASHER, which see.

WASTE. The spoiled bobbins of cotton or woolen mills, used for wiping machinery and for JOURNAL PACKING, which see.

WASTE COCK. 1. (Baker Heaters.) A cock attached to the expansion drum or circulating drum of the Baker heater for drawing off or changing the water in the heater pipes.

WASTE PIPE STUD (Westinghouse Pump Governor). 35, FIGS. 947-50.

WATER ALCOVE. FIGS. 2821-24. A recess in the side of a partition of a passenger car to receive the faucet of a water cooler or water pipe and a drinking cup. The term is generally used to designate the metal casing or lining with which the recess is covered. The water tank for supplying water alcoves is usually placed on the other side of the partition, in the saloon, and commonly when so placed extends to the roof.

WATER CLOSET. FIGS. 3089-90. "A commode with water supply to rinse the basin and carry off the contents."—Knight. The water closet is in increasing use in passenger cars. It is sometimes provided with an upholstered cover, and is then known as a concealing water closet. See, HOWARD'S RAILROAD WATER CLOSET, FIGS. 3089-90.

WATER COOLER. 14, FIGS. 2798-2800. A tank or vessel for carrying drinking water which is usually cooled with ice. The sides are generally made double, and the space between filled with some non-conducting substance. They frequently extend to the roof. See, WATER ALCOVE, WATER TANK.

WATER COOLER VALVE or WASTE COCK. FIG. 2760.

WATER DRIP. 1. A pan or receptacle to receive the waste water from a water cooler. A drip pipe, or waste pipe, connects with it.

2. A slight projection or raised seam in the roof of a passenger or baggage car over the side doors, or at the end of the car in the platform roof to divert the water

so it shall not fall upon persons entering the car or passing from one car to the next.

WATER RESERVOIR (Baker Heater). FIG. 2224. See, CIRCULATING DRUM.

WATER TABLE. 1. (Masonry.) A projecting beveled face of stone to shed water from the parts below. Hence, especially applied to the top course of a foundation, which nearly always has such a face, the masonry above being set back.

2. A WINDOW LEDGE, which see.

WATER TANK. 1. A vessel or reservoir for holding water. Those used on cars for drinking water are usually made of sheet iron, and often extend to the roof. They are then usually drawn from by a water alcove, FIGS. 2821-24, the tank being usually in the corner of the saloon concealed from the interior of the car.

2. Pullman Water Pressure System. FIGS. 2807-19.

WATSON & STILLMAN, JACKS. FIGS. 2978-82. HYDRAULIC JACKS, which see.

WATTMETER. FIG. 4825. An instrument connected into an electrical circuit for measuring the power used therein; if of the indicating type, the instantaneous power is shown by the instrument; if of the recording type, the power is integrated, and the total energy used is recorded. The latter type is sometimes used on an electric car.

3. (Car Trucks.) A SPRING SADDLE, which see.

WAVED MOLDINGS. Moldings which by a special machine are made of a corrugated section longitudinally, the number of waves or corrugations varying from 3 to 6 per inch. The cost of the moldings is increased by this waving from 1½ to 2½ cents per foot.

WAY CAR. FIGS. 63-66. A CABOOSE CAR, which see. Sometimes a so called way car partakes more of the character of a tool car. The application of the term is not well defined.

WAYCOTT DUST GUARD. FIG. 4085.

WEATHER STRIPS FIGS. 2149-52. A rubber strip with a metallic or wooden binding to apply around the crevices of windows or doors, for excluding the dust and wind, and for preventing water from entering around the windows. Weather strips are divided generally into single edge strips and cushion strips, both being usually provided, as now manufactured, with a wood or metal molding. The cushion strip is simply rubber, folded over so as not to show a selvage edge. The standard widths of weather strips are ⅜, ½, ¾, and 1 in. They are usually made in lengths of fifty feet, but some of the cushion strips in lengths of only 7 ft.

WEB (of a Key). The solid portion of the bit of a key, the recesses cut away being termed wards. See, BIT.

WEBBING. A strong fabric, from one to four inches wide, made of hemp or other material which is not liable to stretch, used in upholstering car seats. A detached spring section is shown in FIG. 3229, showing the application of the webbing. Others are shown in FIGS. 3226-36.

WEDGE. A term in quite general use for a JOURNAL BEARING KEY, which see. FIGS. 4238-4424. See also STOP WEDGE.

WEED CUTTING CAR. FIG. 4721. A hand car equipped with a cutting bar, knives and pitman rod like a mowing machine, for cutting the weeds at the side of a track over which the car is run.

WESTERN FLUSH CAR DOOR. FIGS. 1038-39.

WESTINGHOUSE AIR AND STEAM HOSE COUPLING. FIGS. 889-90. See, AUTOMATIC COUPLING.

WESTINGHOUSE AIR BRAKE. FIGS. 891-958. A system of continuous brakes invented and patented (the first patent in 1869) by Mr. George Westinghouse, Jr., which is operated by compressed air. The air is compressed by a steam air pump on the locomotive, and is stored up in a tank called the main reservoir on the engine or tender. By the original form of brake the compressed air was conveyed from the tank by pipes connected together between the cars by flexible brake hose to brake cylinders under each car, by means of which the pressure of the air was communicated to the brake levers, and thence to the brake shoes. A later and improved form is the Westinghouse automatic air brake, commonly called simply Westinghouse brake, which is now in universal use. At the present time the Westinghouse brake, unless otherwise specified, is always understood to mean the automatic air brake. The change made from the original form of the Westinghouse air brake in order to make it automatic was to carry a full pressure of air at all times in the brake pipes and cause the brakes to be applied by a reduction of this pressure instead of by the admission of pressure, so that the breaking apart of the train or a reduction of pressure by escape of air at any point on the brake pipe would apply the brakes to the whole train at once. A further advantage was that the action of the brakes was made quicker by saving the appreciable interval of time required for the compressed air to flow from a single reservoir at one end of the train in sufficient quantities to fill all the brake cylinders. An auxiliary reservoir is placed under each car, containing air at the same pressure as in the brake pipes and main reservoir. An ingenious valve called the triple valve connects the brake pipe, auxiliary reservoir and brake cylinder together in such manner that any reduction of pressure in the brake pipe opens a passage for the air from the auxiliary reservoir to the brake cylinder, applying the brakes, and closes the connection between brake pipe and reservoir. To release the brakes, the pressure in the brake pipes is restored, when the triple valve closes the connection between the auxiliary reservoir and brake cylinder and opens one between the brake cylinder and the outer air and between the auxiliary reservoir and the brake pipe. In order that the train brakes may be applied from any car, each car is fitted with a valve called the conductor's valve, connected to the brake pipe, so that the compressed air therein can be permitted to escape by opening the valve.

WESTINGHOUSE ELECTRIC MOTOR (Street Cars). FIGS. 4888-95.

WESTINGHOUSE ELECTRO PNEUMATIC SYSTEM OF CONTROL. FIGS. 4881-87. A system of control for railway and other motors by means of low potential electric leads taken from storage battery or lamp circuits which operate the pneumatic devices acting directly in connection with the main controller rheostats and connections for each motor. By a movement of the multiple control switch, air from the train line is admitted to the operating head in each car, placed in a compartment above the floor. The speed of the motor is automatically built up by the ratchet gear connected to the air cylinder and resistance. By a connection between the brake cylinder and the operating head, the current is automatically cut out on the application of the brakes and cannot be turned on while the brakes are set. See, CONTROL SYSTEM.

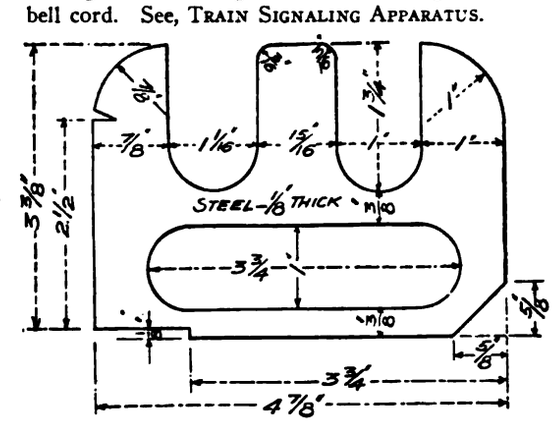
WESTINGHOUSE FREIGHT BRAKE. FIGS. 901-904, 918-19, etc. A device not differing essentially from the Westinghouse passenger brake gear except that the parts are made lighter and cheaper for use on freight cars. To this end the triple valve, reservoir and brake cylinder are commonly combined in one part, as in FIGS. 918-19. The engine, air pump and main reservoir, on the contrary, are made somewhat larger. Special arrangements for operating extra long trains and on extra heavy gradients have been introduced, as shown in the engravings. See, AIR BRAKE and STRAIGHT AIR BRAKE.

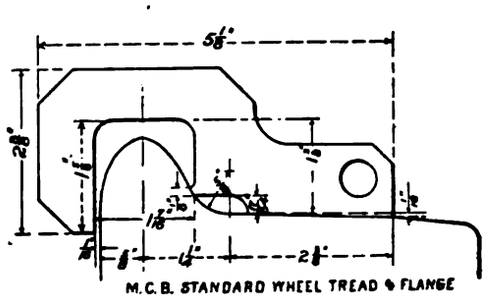
WESTINGHOUSE FRICTION DRAFT GEAR. FIGS. 1142-56. A form of draft gear in which the forces are absorbed and dissipated by friction. The friction device is

encased in a barrel open at the rear end. The rear follower bears against a preliminary spring, the other end of which bears against the centre wedge of the shape of the frustrum of an octagonal pyramid. Surrounding the wedge are four pairs of segmental carriers having one rib each which lies in a groove in the barrel. The other grooves in the barrel are filled by wedge bars resting on the carriers and having lugs cast on them, engaging cavities in the carriers so that the wedge bars must move with them. The function of the preliminary spring is to absorb the slight pressures without bringing into action the friction parts. The main release spring, placed in front of the wedge, returns the wedge and carriers to normal position when the pressure is removed and also adds capacity to the device. When the follower plates are moved toward each other the preliminary spring is compressed until its capacity of 20,000 lbs. is exceeded, when the follower bears against the release pin and forces the wedge forward, relieving the auxiliary release spring from pressure. The follower then forces the segmental carriers in, producing friction between the wedge bars and the grooves. The complete movement gives a resistance of 140,000 lbs. In releasing, the preliminary spring is gradually restored, and the release spring then forces the wedge out, and then the outer coil forces back the wedge bars and carriers, giving a complete release. Owing to the varied width of the slots and lugs on the wedge bars and carriers the bars are released one at a time through successive small distances. The operations of buffing and pulling are exactly the same, except that the load comes on the front or rear follower first, as the case may be. See, DRAFT GEAR.

WESTINGHOUSE TRACTION BRAKE. FIGS. 988-98. A system of air brakes for electric cars operating on the straight air principle. A motor driven compressor under the car supplies compressed air and is controlled by an automatic pressure governor and rheostat. The brakes are operated by the operating valve, placed on the platform next the controller.

WESTINGHOUSE TRAIN SIGNALING APPARATUS. FIG. 958. A device for utilizing the supply of compressed air required for operating the Westinghouse brakes to transmit signals to the engine instead of using the ordinary bell cord. See, TRAIN SIGNALING APPARATUS.





MAXIMUM FLANGE THICKNESS GAUGE.

WHEEL. 1. A circular frame or solid piece of wood or metal which revolves on an axis.

See, BRAKE WHEEL. RATCHET WHEEL. GEAR WHEEL. SPUR WHEEL. HAND WHEEL. WINDING SHAFT RATCHET WHEEL. BRAKE RATCHET WHEEL.

2. FIGS. 4152-4237. A circular frame or disk, as above defined, serving to support a moving vehicle, as car wheel (which see), hand car wheel, street car wheel, etc. Car wheels are generally either cast (chilled) or steel tired. Steel wheels do not come fully under either of these titles. See also, WHEEL TREAD, CAR WHEEL, CHILL.

3. The following extracts from the Rules of Interchange give the defects for which wheels may be replaced.

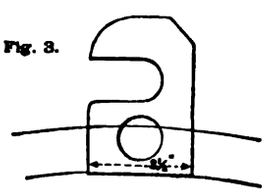
RULE 7. Shelled out: wheels with defective treads on account of pieces shelling out; if the spots are over 2½ inches, or are so numerous as to endanger the safety of the wheel.

RULE 8. Seams 1 inch long or over at a distance of ½ inch or less from the throat of the flange, or seams 3 or more inches long on any other point of the tread.

RULE 9. Worn through chill: when the worn spot exceeds 2½ inches in length. Care must be taken to distinguish this defect from flat spots caused by sliding wheels. Owners responsible.

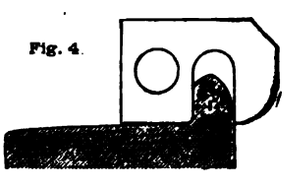
RULE 10. Worn flange: wheels under cars of 80,000 pounds capacity or under, with flanges having flat vertical surfaces extending more than 1 inch from tread, or flange 1 inch thick or less. Wheels under cars of over 80,000 pounds capacity with flanges having flat ver-

Fig. 3.



METHOD OF GAUGING SHELLED AND FLAT SPOTS.
SEE RULES 7 AND 19.

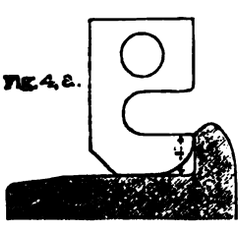
Fig. 4.



METHOD OF GAUGING WORN FLANGES.
SEE RULE 10.

For wheels under cars of 80,000 pounds capacity or under with flanges 1 inch thick or less; over 80,000 pounds capacity with flanges less than 1⅛ inches thick.

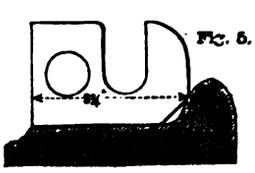
Fig. 4, a.



METHOD OF GAUGING WORN FLANGES.
SEE RULE 10.

For wheels under cars of 80,000 pounds capacity or under, 1 inch from tread; over 80,000 pounds capacity ⅛ inch from tread.

Fig. 5.



METHOD OF GAUGING CHIPPED RIMS.
SEE RULES 15 AND 20.

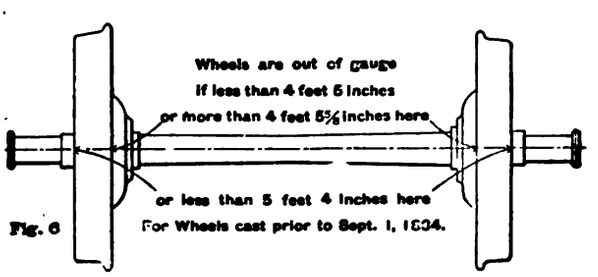

Wheels are out of gauge
If less than 4 feet 5 inches
or more than 4 feet 5⅝ inches here
or less than 5 feet 4 inches here
For Wheels cast prior to Sept. 1, 1894.

Fig. 6

tical surfaces extending more than ⅞ inch from tread, or flange less than 1 1-16 inches thick. (See FIGS. 4 and 4a.)

RULE 11. Thick flange: flange over 1 7-16 inches thick. This does not apply to wheels cast prior to September 1, 1894. (See FIG. 2.)

RULE 12. Tread worn hollow: if the tread is worn sufficiently hollow to render the flange or rim liable to breakage.

RULE 13. Burst: if the wheel is cracked from the wheel fit, outward, by pressure from the axle.

RULE 14. Broken flange, caused by seams, worn through chill or worn flange. See also Rules 20 and 21.

RULE 15. Broken or chipped rim, caused by defective casting, if the tread, measured from the flange at a point ⅝ inch above tread, is less than 3¾ inches, in width. (See FIG. 5.) See also Rules 20 and 21. } Owners responsible.

RULE 16. Cracked tread, cracked plate, one or more cracked brackets, or broken in pieces, under fair usage. See also Rule 20.

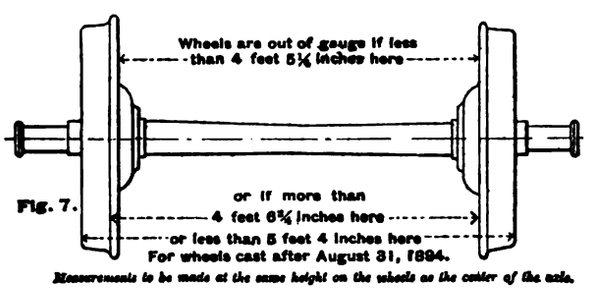
RULE 17. Wheels loose or out of gage. (See FIGS. 6 and 7.)

RULE 18. Chipped flange: if chip is on the outside of the flange and exceeds 1½ inches in length and ½ inch in width, or if it extends ⅛ inch past the center of flange.

RULE 19. Flat sliding: if the spot caused by sliding is 2½ inches or over in length. (Care should be taken to distinguish this defect from worn through chill.)

RULE 20. Broken flange, except as in Rule 14; chipped flange, if chip is on throat side of flange, and exceeds 1½ inches in length and ½ inch in width, or if it extends ⅛ inch past the center of flange; broken rim, if not caused by defective casting, if the tread, measured from the flange at a point ⅝ inch above tread, is less than 3¾ inches in width (see FIG. 5), or any breakage caused by unfair usage, derailment or accident. } Delivering Company responsible.

RULE 21. The determination of flat spots, worn flanges and chipped treads shall be made by a gage, as shown in FIG. 1. The determination of thick flanges shall be made by a gage as shown applied to M. C. B. standard wheel tread and flange in FIG. 2.


Wheels are out of gauge if less than 4 feet 5⅛ inches here
or if more than 4 feet 6¾ inches here
or less than 5 feet 4 inches here
For wheels cast after August 31, 1894.
Measurements to be made at the same height on the wheels as the center of the axle.
Fig. 7.

WHEELS. (Distance Gages Between Flanges). The standard distance between the backs of car wheels, as indicated, FIG. 4368, is 4 feet 5⅜ inches; drawing shows the form of gage for measuring this distance. In 1885 it was decided by letter ballot that in fitting wheels on axles a variation of ⅛ inch each way from the standard distance of 4 feet 5⅜ inches between the flanges would be allowed, making the maximum distance 4 feet 5½ inches, and the minimum distance 4 feet 5¼ inches. See, CHECK GAGE.

WHEELS, SPECIFICATIONS FOR CAST IRON. (Master Car Builders' Recommended Practice.)

In 1896 a committee was appointed to revise the specifications and guarantee for cast iron wheels. It reported to the convention in 1897, but its recommendations were not submitted to letter ballot, and, therefore, not adopted by the Association. In 1899 the committee made a revised report on the specifications for cast iron wheels, the recommendations of which were submitted to letter ballot, and adopted as Recommended Practice. The revised specifications are as follows:

1. Chills must have the same inside profile as shown by M. C. B. drawing of wheel tread, FIG. 4292. The inside diameter of chill must be the M. C. B. standard of 33½ inches, measured at a point 2⅝ inches from outside of tread of wheel.

The chills must be of equal diameters, and the same chill must not vary at different points more than one-thirty-second (1-32) of an inch in diameter.

2. Wheels of the same nominal diameter must not vary more than one-fourth (¼) of an inch above or below the mean size measured on the circumference, and the same wheel must not vary more than one-sixteenth (1-16) of an inch in diameter. The body of the wheel must be smooth and free from slag, shrinkage or blow holes. The tread must be free from deep and irregular wrinkles, slag, chill cracks and sweat or beads in throat, and swollen rims.

3. The wheels broken must show clean gray iron in the plates, except at chaplets, where mottling to not more than one-half (½) inch from same will be permitted. The depth of pure white iron must not exceed one (1) inch, nor be less than one-half (½) inch in the middle of the tread, and shall not be less than one-fourth (¼) of an inch in the throat. The depth of the white iron shall not vary more than one-fourth (¼) of an inch around the tread on the rail line in the same wheel.

4. For each hundred wheels which pass inspection and are ready for shipment, two representative wheels shall be taken at random, one of which shall be subjected to either of the following tests:

The wheel shall be placed flange downward on an anvil block, weighing not less than seventeen hundred (1,700) pounds, set on rubble masonry at least two (2) feet deep, and having three supports not more than five (5) inches wide to rest upon. It shall be struck centrally on the hub by a weight of one hundred and forty (140) pounds, falling from a height of twelve (12) feet. Should this wheel stand ten (10) blows without breaking into two or more pieces, the hundred wheels shall be accepted.

Or, the wheel shall be placed flange downward on a cast iron ring weighing one thousand (1,000) pounds, the outside diameter of the ring being thirty-six and one-half (36½) inches, the inside diameter twenty-four (24) inches, and thickness eight (8) inches, supported on rubble masonry at least two (2) feet deep. It shall be struck on the plate, close to the rim, by a weight of one hundred (100) pounds, falling from a height of seven (7) feet. When subjected to this test a five hundred and fifty (550) pound wheel shall stand twenty (20) blows; a five hundred and seventy-five (575) pound wheel, twenty-five (25) blows; a six hundred (600) pound wheel, thirty (30) blows; a six hundred and twenty-five (625) pound wheel, thirty-five (35) blows, and a six hundred and fifty (650) pound wheel, forty (40) blows without breaking a piece out.

The other wheel shall be subjected to the following test:

The wheel must be laid flange down in the sand, and a channel way one and one-half (1½) inches wide, and four (4) inches deep, must be molded with green sand around the wheel. The clean tread of the wheel must form one side of this channel way, and the clean flange must form as much of the bottom as its width will cover. The channel way must then be filled to the

top with molten cast iron, which must be hot enough, when poured, so that the ring which is formed when the metal is cold shall be solid or free from wrinkles or layers. The time when the pouring ceases must be noted, and two minutes later an examination of the wheel must be made. If the wheel is found broken in pieces, or if any crack in the plate extends through the tread, the one hundred wheels represented by the tests will be rejected.

5. In either case of the drop tests, should the test wheel break in two or more pieces with less than the required number of blows, then a second wheel shall be taken from the same lot and similarly tested. If the second wheel stands the test, it shall be optional with the inspector whether he shall test a third wheel or not; if he does not do so, or if he does and the third wheel stands the test, the hundred wheels shall be accepted.

6. The lower face of the weight of one hundred and forty (140) pounds shall be eight (8) inches in diameter, and crowned one-half (½) inch. The lower face of the weight of one hundred (100) pounds shall be six (6) inches in diameter, crowned to a radius of three (3) inches.

7. Wheels shall not vary from the specified weight more than two per cent.

8. The thickness of the flange shall be regulated by the maximum and minimum flange thickness gage adopted by the M. C. B. Association and shown in M. C. B. drawing No. 12, FIGS. 4371-72.

9. All wheels must be numbered consecutively, and shall have the number, also the day, month and year when made, plainly formed on the inside plate in casting, and no two wheels shall have the same number. All wheels shall also have the name of the maker and place of manufacture plainly formed on the plates in casting.

10. Individual wheels will not be accepted which

1. Do not conform to standard design and measurements.
2. Are under or over weight.
3. Have physical defects described in Section 2.

Any lot of one hundred wheels submitted to test will not be accepted:

1. If wheels broken do not meet the prescribed drop tests;
2. If the wheel tested does not stand the thermal test.
3. If the conditions prescribed in Section 3 are not complied with.

WHEEL AND TRACK (Terms and Gaging Points). FIG. 4367. Standard terms and gaging points for wheels and track were adopted in 1894, as follows:

1. Track rails are the two main rails forming the track.

2. Gage of track is the shortest distance between the heads of track rails.

3. Base line, for wheel gage, is a line parallel to the axis of the wheels drawn through the point of intersection of tread with a line perpendicular to the axis, and passing through the centre of the throat curve.

4. Inside gage of flanges is the distance between backs of flanges of a pair of mounted wheels measured on a line parallel to the base line, but ¼ inch nearer to the axis of the wheels.

5. Gage of wheels is the distance between the outside faces of flanges of a pair of mounted wheels measured on a line parallel to the base line, but 17-64 inches farther from the axis of the wheels.

6. Thickness of flange is the distance measured parallel to the base line between two lines perpendicular thereto, one drawn through the point of measurement of "gage of wheels."

7. Width of tread is the distance measured parallel to the base line from a line perpendicular thereto, drawn through the point of measurement of "gage of wheels" to the outer edge of tread.

8. Check gage distance is the distance measured parallel to the base line between two lines perpendicular thereto, one drawn through the point of measurement of "inside gage of flanges" on either wheel, and the other drawn through point of measurement of "gage of wheels" on mate wheel.

9. Over all gage is the distance parallel to base line from outer edge of one wheel to the outer edge of mate wheel.

The above mentioned wheel gage distances are either directly or by inference as follows:

Inside Gage of Flanges	4 feet	5⅜ inches.
Gage of Wheels	4 "	8⅛ "
Thickness of Flange		1⅜ "
Width of Tread		4⅛ "
Check Gage Distance	4 "	6¾ "
Over All Gage	5 "	4⅜ "

WHEEL BAR (Six Wheel Truck). FIGS. 3940-42. A substitute of an iron for a wooden wheel piece to which the pedestals are attached.

WHEEL BOSS (English). American term, hub. The center of the wheel, which is bored out to receive the axle.

WHEEL BOX (Street Cars). A covering for a wheel which projects through the floor. The sides are usually of wood and the top of sheet iron, but they are sometimes made entirely of wood or metal.

WHEEL CENTER (Steel Tired Wheels). FIGS. 4152-4213, etc. The portion of a wheel inside of the tire and between it and the hub or boss. The wheel center is sometimes in one piece and sometimes made up of two parts, the hub or boss and the central filling piece. Face plates, front and back, are also used. The term is seldom applied to chilled or cast wheels.

WHEEL CENTER, or SKELETON. The whole of a railroad wheel, except the tire, and the fastenings which connect the tire to the rim.

WHEEL CHECK GAGE. See, CHECK GAGE.

WHEEL CIRCUMFERENCE MEASURE. FIGS. 4288-91. By letter ballot in 1893 the wheel circumference measure was adopted as a standard of the Association. Prior to that date it had been recommended for use in all car building shops. In 1900 a new form of wheel circumference measure was adopted as standard, FIGS. 4288-91.

WHEEL COVER (English). See, SPLASHER.

WHEEL CUT GLASS. The ordinary process of glass cutting, which leaves a perfectly polished and perfectly transparent surface.

WHEELER CAR SEATS. FIGS. 3173, etc. A slideover car seat made by Heywood Bros. & Wakefield.

WHEEL FIT. See, WHEEL SEAT.

WHEEL FLANGE. FIG. 4292. The projecting edge or rim on the periphery of a car wheel for keeping it on the rail.

WHEEL FLANGE THICKNESS GAGES, FOR NEW WHEELS. FIGS. 4371-72. Maximum and minimum wheel flange thickness gages for new wheels were adopted as standard in 1894. These gages admit a variation of 1-16 inch either way from the standard thickness of 1⅜ inches when measured, as shown. Such gages should be used on all new wheels after September 1, 1894, to insure ability to mount them properly to check gage.

WHEEL FLANGES, GAGES FOR MAX. AND MIN. THICKNESS (M. C. B. Standard). FIGS. 4371-72. See, WHEEL.

WHEEL PIECE. 10, FIGS. 3735-3951 and FIGS. 3821-2. A stick of timber in a wooden frame truck, which forms the side of the frame and to which the pedestals are attached. It is often stiffened by outside and inside wheel piece plates or by a wheel piece truss rod, the latter serving also as a wheel piece tie rod to tie the two end pieces firmly to the wheel piece. A wheel piece tie rod is in all cases used, but it is not always used in the form of a truss rod. Iron wheel pieces are sometimes called wheel bars.

WHEEL PIECE PLATE. 11, 12, FIGS. 3781-3951 and FIGS. 3825-27. See above.

WHEEL PIECE TIE ROD. See above.

WHEEL PIECE TRUSS ROD. 13, FIGS. 3735-3951. See above.

WHEEL PLATE. 1. (Cast Iron Wheels.) That part of a plate car wheel which connects the rim and the hub. It occupies the place and fulfills the same purpose as the spokes do in an open or spoke wheel. See, CAR WHEEL, WHEEL, WASHBURN WHEEL, PLATE WHEEL.

2. (Steel Tired Wheels.) FIGS. 4178-83. See, FACE PLATE.

WHEEL RIBS (Cast Iron Wheels.) FIGS. 4217-8. More commonly, brackets. Projections cast usually on the inner side of plate car wheels to strengthen them. They are placed in a radial position and are often curved so as to permit the wheel to contract when it cools.

WHEEL SEAT, or WHEEL FIT (of an Axle). The part which is inserted in the hub of a wheel. It is made truly cylindrical and very slightly larger than the axle seat of the wheel. The wheel is pressed on it by hydraulic pressure, and very rarely becomes loose. Prick punching and shimming the seat have been forbidden by the Rules of Interchange. See, WHEELS.

WHEEL TIMBER. A WHEEL PIECE, which see.

WHEEL TIRES, MINIMUM THICKNESS OF STEEL TIRES (M. C. B. Recommended Practice). FIG. 4531. See, INTERCHANGE OF TRAFFIC. STEEL TIRE.

WHEEL TREAD. The outer surface or part of a car wheel which bears on the rails. The standard width of wheel tread is 5½ in. measured from outside of tread to inside of flange, i. e., including the entire thickness of the flange. See, FIG. 4292.

WHEEL TREAD AND FLANGE. FIG. 4292. This form of wheel tread and flange was adopted as a standard of the Association by letter ballot in 1886.

WHEEL TRUING BRAKE SHOE. FIG. 1025. A brake shoe with abrasive inserts to grind the wheel tread and flange true to center while in service.

WHISK BROOM, or WISP BROOM, and HOLDER. FIG. 2963. A small broom for brushing wearing apparel, furniture and upholstering.

WHITE METAL BAND. FIGS. 3268-79. More properly SEAT BACK MOLDING, which see.

WHITWORTH GAGES. See, CYLINDRICAL GAGES.

WHITWORTH SYSTEM OF SCREW THREADS. A system of screw threads designed by Sir Joseph Whitworth, of England, and which is almost universally used in that country and throughout Europe. It differs from the Sellers system in that the sides of the threads stand at an angle of 55 degrees instead of 60 degrees, and the tops of the threads and the spaces between them at the root are rounded, instead of being flat, as in the Sellers system. The number of threads per inch in the two systems is as follows:

Diameter of screw.	No. threads per in.	Diameter of screw.	No. threads per in.
¼	20	1⅛	7
5-16	18	1¼	7
⅜	16	1⅜	6
7-16	14	1½	6
½	12	1⅝	5
⅝	11	1¾	5
¾	10	1⅞	4½
⅞	9	2	4½
1	8		

The Whitworth pipe thread differs from the above. See, PIPE THREAD.

The Whitworth system in this country has practically passed out of use. See, SCREW THREAD.

WICKES REFRIGERATOR CAR. FIGS. 206-7. Shows the Wickes system of refrigeration. In the Wickes car the refrigerator doors open out and are flush with the outside sheathing. See, FIGS. 1070-72. The usual sliding doors are omitted. There is a cooling compartment at each end, occupying the full width of the car and 2 feet 10 inches of the length and separated from the storage compartment by a wooden partition or jacket, which starts about 2 feet from the floor and extends to within about 16 inches of the ceiling.

There are two ice tanks in each cooling compartment. These tanks, are constructed of an oak framework, to which are nailed in vertical and horizontal rows galvanized iron strips 2 inches wide interwoven in the manner of basketwork. Projecting outward from these strips 2 inches are galvanized iron leaves which largely increase the cooling surface. These tanks are separated from one another, from the jacket and from the walls at the sides at the end of the car by air spaces of about 4 inches. They are supported by 2x4 inch oak grate bars 2 feet from the floor. Beneath the bars are many rows of galvanized iron wire, crossing and recrossing from side to side of the car. A sloping bottom or apron of galvanized iron at the bottom of the jacket leads the drip water to the wires. There is another apron of galvanized iron in front of the wires extending to within 12 inches of the floor. On the floor, directly under the wires, is the drip pan, with a properly trapped drain at each end. The drip water falls from the ice through the grate bars on to the wires and down into the drip pan. The warm air enters the cooling compartment through the opening at the top of the jacket, and, descending as it cools, comes in contact with the ice, the metal surface of the tanks, the wires, and the spray of drip water about the wires, and re-enters the car through the opening below the apron in front of the wires, having become cooled, dried and purified. Each tank is iced through an opening in the roof, provided with an inner and outer door, each properly insulated.

This car may be also used for shipment of goods under ventilation. When so used the ice hatches are left open and protected by iron screens. This gives a thorough circulation of air into the openings at the front end, passing the length of the car and out through the openings at the rear end.

WICK SLEEVE. STUDENT LAMP, which see.

WIDE GAGE. In general usage, the distance between the heads of the rails of a railroad when it is slightly greater than 4 ft. 8½ in., in distinction from broad gage, which see, which means a material increase, as to 5 ft. or 6 ft.

WIND CAP (Pintsch Lamp). 469, FIGS. 2605-21.

WIND GUARD (Pintsch System). 200, FIG. 2526. A perforated brass disc, fitting in globe holder, 80b, FIG. 2531, below the opal globe, 102, FIG. 2549, and supplied with a small covered hole for admitting a match or taper when lighting the gas. Its purpose is, as indicated by its name, to protect the flame from the action of drafts from below the globe.

WIND SCOOP. FIG. 3103. A hood or ventilating jack (often so called) attached to a pipe passing through the roof of a car, and so formed as to create either an exhaust draft or the contrary by the current of external air passing over the car.

WINDING ARBOR. See, SQUARE END.

WINDING GEAR (Pile Driver Car). Consists of spools and a spur gear of the ordinary form controlled by a strap brake and treadle, so that on the release of the brake the shears attached to the hammer rope will descend by their own weight and engage with the hammer eye.

WINDING SHAFT (Drop Doors of Coal Cars, etc.). 70, FIGS. 271-95. A round iron bar supported by the winding shaft plates, to which the drop door chain or hopper chain is attached. It carries a ratchet wheel.

WINDING SHAFT PLATE (Hopper Bottom Coal Car). FIGS. 271-95. The plate attached to the side of the car carrying the ratchet wheel, pawl and dog, serving as a bearing for the winding shaft. See above.

WINDING SHAFT RATCHET WHEEL AND PAWL. 66, 67, FIGS. 271-95. See above.

WINDOW. 137, FIGS. 360-72, 385-87, 388-91 and FIGS. 1781-82. "An opening in the wall of a building or car for the admission of light and of air when necessary. This opening has a frame on the sides, in which are set movable sashes containing panes of glass."—Webster. Hence the window itself, especially in compound words, is often termed simply the sash. In England carriage windows are technically termed lights. See also DECK SASH. Car windows are now generally made of uniform size throughout; twin windows, small windows, etc., are rarely used. In sleeping and parlor cars double windows are almost always used to inclose an air space between them and prevent radiation of heat and drafts.

WINDOW BALANCE. W, FIGS. 381-91 and FIGS. 3691-94, 3705, 3709. A device in which a spring is used instead of a weight to counterbalance the weight of the sash and glass. See, SASH BALANCE.

WINDOW BLIND. 140, FIGS. 388-91, etc. A wooden screen composed of a frame called the sash, carrying slats, placed in a window to exclude sunshine. Window blinds, especially in street cars, are sometimes made single, but for lack of room to raise so large a sash they are usually made double and distinguished as upper and lower. Window shades have nearly displaced blinds in first class passenger cars, blinds being used in the saloons only.

WINDOW BLIND BOLT. FIGS. 3584-92. A bolt used for holding a window blind in any desired position. It enters into window blind bolt bushing or plate.

WINDOW BLIND BOLT BUSHING. FIGS. 3579-80. See above. Same as sash lock bushing.

WINDOW BLIND LIFT. FIGS. 3593-3620. Commonly called simply blind lift. A metal hook fastened to the blind for raising and lowering it, usually attached to the bottom rail, but in street car blinds, which are lowered below the window, to the top rail. Window blind lifts are distinguished as single and double, the single lift being the upper and the double lift the lower, which has a projection for raising the outer part. Double window blind lifts are also distinguished as lower and upper. The upper lift differs from the lower by not having a lug or ledge, which is carried on the lower blind for the purpose of engaging with the upper when the lower one is half raised, so that the two may thereafter be raised together.

WINDOW BLIND MULLION. An upright bar in the center of a window blind sash.

WINDOW BLIND PULL. A WINDOW BLIND LIFT, which see.

WINDOW BLIND RAIL (Street Cars). A horizontal bar of a window blind sash.

WINDOW BLIND REST. 1. A wooden strip to fill up the lower part of the groove in which an upper window blind slides, and on which it rests when down.

2. (Street Cars.) A horizontal strip of wood which extends from one body post to another, on which the blind rests when it is lowered.

WINDOW BLIND SASH. 86, FIGS. 388-91. The frame in which the inclined thin slats are held.

WINDOW BLIND SLAT. See above.

WINDOW BLIND SPRING. FIGS. 3575-77. The same as a SASH SPRING, which see.

WINDOW BLIND STILE. An upright bar in a window blind sash.

WINDOW BLIND STOP. An INSIDE WINDOW STOP, which see.

WINDOW CASING. 7, FIG. 1782. A frame which incloses or surrounds a window. Often called an inside window stop.

WINDOW CORNICE. A purely ornamental projecting structure, usually made of wood, placed over a window on the inside. It is now little used.

WINDOW COVE MOLDING. 87, FIGS. 388-91 and 26, FIG. 1782. A small concave molding around the sides and top of a window on the inside of a passenger car.

WINDOW CURTAIN. C, FIG. 1781. A cloth or some kind of textile material loosely hung over a window to exclude sunshine, and which can be spread or drawn aside at pleasure. Curtains of this kind are now little used. WINDOW SHADES, which see, lie always flat, and are rolled up upon shade rollers. They are often also called curtains.

WINDOW CURTAIN BRACKET. FIGS. 3725-28. More commonly, simply curtain bracket, for supporting window shade rollers. A more correct term would be shade or window shade brackets, but in common usage, curtain brackets support shade rollers.

WINDOW CURTAIN HOLDER OR HOOK. Y, FIG. 1781; FIGS. 2869-74. A metal hook fastened at the side of a window for holding a curtain when drawn aside. Knobs are also used.

WINDOW CURTAIN KNOB. A form of window curtain hook.

WINDOW CURTAIN LEATHER. FIGS. 3715-22. More properly, window shade leather.

WINDOW CURTAIN RINGS. FIGS. 2845-48. See, CURTAIN.

WINDOW CURTAIN ROD. FIGS. 2831-33. See, CURTAIN.

WINDOW CURTAIN ROLLER. FIG. 3724. More properly, a SHADE, or WINDOW SHADE ROLLER, which see.

WINDOW DEFLECTOR VENTILATOR. See, DEFLECTOR and VENTILATOR.

WINDOW DUST GUARD OR DEFLECTOR. FIGS. 3695-98. A thin narrow board of the height of the window adjusted perpendicular to the car side at the forward edge of the window, to deflect dust and cinders so they shall not enter the open window. It is fastened to the window casing by a dust guard spring holder, FIG. 3704.

WINDOW FASTENER. FIGS. 3647-60. A SASH LOCK, which see.

WINDOW FURNISHINGS (for Deck Sashes). FIGS. 3504-74. (Lower Windows.) FIGS. 3621-3728.

WINDOW GLASS. Panes of glass used for windows. They are either plate or rolled glass, made by pouring the molten glass onto a table having the height of the desired thickness of the plate, and then passing a roller over the top, or blown, or common window glass, the latter being by far the cheapest and most widely used, but of very much inferior quality. It is made by blowing the glass into a large bulb, which is then slit open while still hot and flattened out.

WINDOW GRATING. A wrought or cast iron partition made of bars, or in other form, placed on the outside of the windows of passenger cars to prevent passengers from putting their heads or arms outside. Now rarely used.

WINDOW GUARDS (Street Cars). FIGS. 3038-39, etc. Small metal rods to act as fenders for the end windows.

WINDOW HOLDER. A SASH HOLDER, which see.

WINDOW LATCH. FIGS. 3647-61. A SASH LOCK, which see.

WINDOW LATCH PLATE. A form of sash lock stop.

WINDOW LATCH STOP (Lower and Upper). See, SASH LOCK STOP.

WINDOW LEDGE (Street Cars). A projecting molding outside of a car which extends from one end of it to the other above the windows, intended to shed the rain. A water table or window lintel.

WINDOW LIFT. See, SASH LIFT.

WINDOW LINTEL. 90, FIGS. 360-72, 385-87, 388-91. A horizontal strip on the outside of a passenger car between the posts and over the window openings.

WINDOW MOLDING (Passenger Car Interiors). 88, FIGS. 388-91. Known to the trade as car moldings, and used around or on each side of a window, especially to cover the joint between the panel and post. It some-

times forms a groove on the post in which a window or window blind slides, in place of the INSIDE WINDOW STOP, which see.

WINDOW MOLDING BASE. An ornament made of wood or metal attached to the lower end of a window molding.

WINDOW MOLDING JOINT COVER. A piece of metal or wood used to cover the joints of window moldings when two pieces join each other.

WINDOW PANEL. 68, FIGS. 360-372. See, PANEL. A panel between the windows known as inside, outside and end.

WINDOW PANEL FURRING. Horizontal distance pieces between the window posts to which the panel is fastened.

WINDOW PILASTER, CAP AND BASE. 8, 9, 10, FIG. 1782. A decorative feature of a car interior, placed between the windows and covering the window post.

WINDOW POST (Passenger Cars). 58, FIGS. 360-72, 385-7, 388-91. A post extending from sill to plate at the side of a window opening, against which the sash and blind slide.

WINDOW RAIL. 12, FIG. 1782. A horizontal bar in a window sash.

WINDOW ROD BUSHING. FIGS. 2855-57. A support for the ends of a CURTAIN ROD, which see.

WINDOW SASH. 85, FIGS. 360-72, 388-91. See, SASH.

WINDOW SASH BALANCE. See, WINDOW BALANCE and SASH BALANCE.

WINDOW SASH HOLDER. See, SASH LOCK. FIGS. 3647-61.

WINDOW SASH LIFT. A SASH LIFT, which see. FIGS. 3662-90.

WINDOW SASH REST (Street Cars). A strip of wood extending from one body post to another, on which the sash rests when lowered.

WINDOW SASH SPRING. FIGS. 3575-77. See, SASH SPRING.

WINDOW SHADE. 140a, FIGS. 388-91. A window curtain, which is wound on a roller above the window, in distinction from one which is drawn aside. In car building it is finished at the bottom with a window shade leather, FIGS. 3715-22, and heavy window shade rod bar or shade holder, FIGS. 3711-14. A rectangular slot, which is somewhat inaccurately called an eyelet, is inserted in the leather to fasten the shade down by slipping it over the sash lift. In passenger cars window blinds have been superseded by shades, and all sleeping and parlor cars have window shades in place of blinds. An automatic shade roller is always used, the old fashioned pulleys and cord tighteners being practically obsolete.

WINDOW SHADE LEATHER. FIGS. 3715-22. See above.

WINDOW SHADE STOP. 10, FIG. 1782. That part of a shade holder which engages with or bears against the window casing and holds the shade.

WINDOW SHADE THUMB LATCH. 16, FIG. 1782; FIGS. 3710-13. A thumb latch which releases the bottom of the shade so that it may be moved up or down. It fixes the shade in any position automatically.

WINDOW SILL. 77, FIGS. 360-72 and 77, 78, FIGS. 388-91. A horizontal piece of wood or metal under a window, on which the sashes rest when down. There are usually two, inside and outside. A thin strip called the window sill cap goes above it.

WINDOW SILL CAP. See above.

WINDOW SILL CORNICE BOARD. 65a, FIGS. 388-91.

WINDOW SILL MOLDING. 80, FIGS. 388-91. A small wooden molding under an inside window sill. In modern cars it is usually a belt molding.

WINDOW SPRING. FIGS. 3575-77. See, SASH SPRING.

WINDOW STILE. 11, FIG. 1782. N, FIG. 1781. The upright bars of a window sash.

WINDOW STOP. The strips, or beads, attached to the window posts which hold the sashes in place. There are always two, inside and outside, and parting beads or sash parting strips in between.

WINDOW STOP (Inside). See, WINDOW CASING.

WINDOW VALANCE. See, VALANCE.

WINDOW VENTILATOR. See, DEFLECTOR VENTILATOR.

WINSLOW CAR ROOF. FIGS. 1714-26. A car roof which consists of metal roof sheets laid crosswise to the car. They are made with corrugations and are let into grooves in the rafters. The latter are covered with strips of sheet iron and the whole with a layer of transverse boards, which are fastened to longitudinal purlins attached to the rafters or carlines. See, CAR ROOF and MURPHY'S IMPROVED WINSLOW ROOF.

WIRE. See, SEAL WIRES, FIGS. 3122-37.

WIRE BASE (Lantern). FIGS. 2730-32.

WIRE COVERED BELL CORD. See, BELL CORD. Little used.

WIRE GAUZE (for Ventilator). A fine netting made of wire with which the outside of deck windows and ventilator openings are covered to prevent the admission of dust.

WIRE SHADE TRIPOD. See, SHADE RING.

WOODEN BRAKE BLOCK (English). A piece of soft wood used in England as a BRAKE BLOCK, which see.

WOOD CENTER CAR WHEEL, A form of car wheel used in England almost universally for passenger service, but rarely in this country. The wheel center is entirely made up of teakwood used as a continuous and solid series of spokes held in place by side plates and Mansell retaining rings. Called in England the Mansell wheel. See, STEEL TIRED WHEEL, CAR WHEEL, TIRE FASTENING.

WOODEN FLOOR MAT (Street Cars). A sort of grating made of strips of wood, with distance pieces and spaces between.

WOODEN FRAME TRUCK. A car truck, of which the wheel pieces and end pieces are made of wood. FIGS. 3781-83 are illustrations. See, TRUCK. CAR TRUCK.

WOODEN WHEEL (Hand Cars). A form of WOOD CENTER WHEEL, which see.

WOOD'S PLATFORM GATE. FIGS. 3040-41. A gate, the details of which are shown in the figures, that has found considerable favor on steam and suburban roads. When opened it folds against the end of the car quite out of the way.

WOOD SCREW. FIG. 2504. A small cylindrical bar of iron or steel with a wood screw thread cut on it and a slotted head so that it can be turned with a screw driver. A lag screw is a heavy kind of wood screw, but is not so called. It has a square instead of a slotted head, as FIG. 2502. See, SCREW.

WOOD SCREW THREAD. A form of screw thread used for screws which are intended to screw into wooden objects. It differs from a metal thread in having the spaces between the projections wider.

WOODWORKING MACHINERY. FIGS. 4912-53.

WORLD VENTILATOR. FIG. 3493. See, VENTILATORS.

WORM. A helix like a screw thread for winding a rope or a chain upon. See, BRAKE CHAIN WORM, FIGS. 691-692.

WORN FLAT. (Car Wheels). Under the rules for the interchange of traffic this defect is defined to be irregular wear under fair usage, due to unequal hardness of the tread of the wheel, and to be carefully distinguished from slid flat, which is a defect produced by the slipping of the wheels from excessive brake pressure. The rules provide that flats exceeding 2½ in. in length are cause for rejection. See, WHEELS and INTERCHANGE.

WRECKING CAR. FIGS. 142-44. Also called tool car, or derrick car, or wrecking crane. The most powerful type is worked entirely by steam and has sufficient capacity to lift a locomotive.

WRECKING FROG. A froglike device with one end elevated to form an incline plane by which derailed trucks can be replaced upon the track by pulling the car in the direction of its length.

WRENCH. A contrivance for screwing and unscrewing a nut. A monkey wrench is adjustable to take nuts of various sizes. A socket wrench is one having a cubical

cavity to receive a square end. The wrenches for the Westinghouse brake are packing nut and cap screw wrenches, and the discharge valve seat wrench. A SPANNER, FIG. 928, which see, is a wrench for use on round or many sided nuts, like hose couplings to which lugs or slots are added for engaging with the wrench.

WROUGHT IRON WHEEL. 1. FIGS. 4209, 4211, etc. A steel tired wheel, with a wrought iron center, either with spokes or with solid plates.

2. (English.) A "wagon wheel." A wheel in which the rim and spokes are of wrought iron and the hub (boss) is either of wrought or cast iron. If the former, the spokes are welded to it; if the latter, it is cast round the spokes. The tire is shrunk on. This wheel is largely used in freight (goods) service in England, and in both freight and passenger service on the continent of Europe. See, WHEEL. CAR WHEEL.

WROUGHT MOLDING, or FASCIA MOLDING (English). A molding which is worked out of the solid on a horizontal or vertical part of the framing of a carriage body. See, PLANTED MOLDING.

X

"X" CAR ROOF. A form of roof little used, except on cheap cars, in which the carlines are, in form at least, independent rafters crossing each other under the upper deck in the form of an X. An "A" CAR ROOF, which see, is a different type of the same general idea; both unusual.

Y

YALE LOCK. FIGS. 2097-2107. A type of lock, named after its inventor, having a small key bitted on its upper edge to engage with pin tumblers contained in a cylinder. The original flat key has been superseded by the corrugated and paracentric forms. The key raises the pin tumblers to the proper height, and is then able to rotate a plug in the cylinder, and thus to actuate the lock. The advantages of the Yale lock are its compactness, simplicity, security and unequalled capacity for key changes. It is made in a great variety of forms adapted to nearly all uses.

YOKE. 1. A pocket strap, U-shaped, which contains the spring and follower plates of a drawbar. It is the means of attaching the drawbar to the spring and follower plates.

2. (M. C. B. Standard.) FIGS. 4355-56.

In 1897 the yoke or pocket strap for attaching M. C. B. couplers to cars, which had been shown on Sheet B as Recommended Practice, was adopted as Standard of the Association, with the addition of a radius of ¼ inch at the back end of the strap. Proceedings 1897, pages 77 to 87. In 1899 the radius at back end was increased from ¼ inch to ⅝ inch.

INDEX TO ENGRAVINGS.

Note.—The following engravings, 4,971 in all, are alphabetically arranged under the following general heads; these ten general headings include the engravings, and they are again sub-classed alphabetically. The page number is put at the bottom of each page.

	Page.	Fig. No.
CARS, General Views, *Exterior and Interior*.....(36 *pages*, 158 *cuts*)	1	1
CAR BODIES .....(76 " 281 ")	37	159
CAR BODY DETAILS(77 " 1,370 ")	113	440
CAR FURNISHINGS. (97 " 1,919 ")	190	1,810
TRUCKS .....(14 " 223 ")	287	3,729
TRUCK DETAILS....(15 *pages*, 286 *cuts*)	301	3,952
M. C. B. STANDARDS AND RECOMMENDED PRACTICE(23 *pages*, 476 *cuts*)	316	4,238
HAND CARS .....(3 " 17 ")	339	4,714
ELECTRIC CARS ....(23 " 181 ")	342	4,731
CAR SHOP MACHINERY. (9 *pages*, 60 *cuts*)	365	4,912

Total Number of Pages and Cuts..... 373 *pages*, 4,971 *cuts*.

If the above general arrangement be borne in mind, there will be no difficulty in turning at once to any class of engravings desired, all being alphabetically arranged under their title and sub-title, as shown above and more fully in the following detailed index. Under each of the headings and sub-headings of the following list, the engravings are in general arranged alphabetically, according to the names of roads or otherwise, so far as their nature would permit. In a few cases cars have been grouped together on account of their construction features and uses, in preference to the particular kind of freight carried, and by which name they are usually distinguished. This, it is thought, will not lead to confusion, as they are never widely separated, but are nearly in alphabetical order.

	Page.	Fig.
CARS, Freight, *General Views.*		
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" " *Furniture,* " "	1	4
" " *Produce,* " "	2	6
" " *Fruit,* " "	2	7
" " *Refrigerator,* "	3	8
" " *Flat,* " "	5	14
" " *Gondola,* " "	6	21
" " *Hopper,* " "	8	31
" " *Dump,* " "	12	49
" " *Logging,* " "	13	54
" " *Stock,* " "	14	57
" " *Caboose,* " "	16	64
" " *Tank.* " "	17	67
" **Passenger,**		
" " *Coach,* " "	18	69
" " *Dining,* " "	21	82
" " *Parlor,* " "	22	89
" " *Private,* " "	23	92
" " *Sleeping,* " "	23	95
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" " *Gondola Cars*....	61	239
" " *Hopper Gondola Cars*	70	271
" " *Hopper Cars*...	74	287
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" " *Steam Shovel*....	95	357
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" " *Dining Car*.....	99	368
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" *Air, Westinghouse*....	132	891
" " *Signal Apparatus*	140	958
" " *New York*.....	141	959
" " *Christensen*	144	986
" " *Westinghouse Traction*	145	988
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" " *Platforms* .	172	1,526
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	Page.	Fig.
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" " " *Safety.*	215	2,395
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" " Journal Bearings	306	4,091
" " Journal Boxes	306	4,100
" " Side Bearings and Center Plates	307	4,123
" " Springs	309	4,138
" " Wheels	309	4,152
" " " *Tire Fastenings*	315	4,229
MASTER CAR BUILDERS' STANDARDS:		
Journal Boxes and Details	316	4,238
Axles and Wheel Gages	320	4,284
Brake Gear	321	4,295
Pedestals	322	4,337
Couplers	323	4,345
Wheel and Track Gages	324	4,367
Flooring and Siding	327	4,428
Arch Bars	328	4,433
Hand Holds	328	4,444
Pedestal	328	4,468
Wheel Mounting Gage	329	4,481
MASTER CAR BUILDERS' RECOMMENDED PRACTICE:		
" *Attachment of Couplers*	330	4,490
" *Uncoupling Arrangements*	330	4,507
" *Collection of Salt Water Drippings*	330	4,529
" *Safety Chains*	331	4,532
" *Journal Bearings and Wedge Gages*	331	4,556
" *Loading Lumber, etc., on Open Cars*	332	4,576
" *Springs for Pedestal Trucks*	334	4,652
" *Springs and Spring Caps, Arch Bar Trucks*	335	4,655
" *Twist Gage for Couplers.*	335	4,659
" *Box Car Side and End Doors*	336	4,668
" *Gage for Worn Couplers*	337	4,705
" *Marking of Couplers*	337	4,707
" *Drop Test Machine*	338	4,711
HAND CARS, *General Views*	339	4,714
" *Working Drawings*	340	4,722
ELECTRIC CARS, *General Views*	342	4,731
" *Car Bodies*	346	4,748
ELECTRICAL MACHINERY, *Motors, Controllers, etc.*	352	4,774
ELECTRIC CAR TRUCKS	362	4,899
CAR SHOP MACHINERY:		
" " *Wood Working Tools*	365	4,912
" " *Forging Machines*	372	4,954
" " *Pneumatic Tools*	372	4,956

Fig. 1. Box Car, Pressed Steel Underframe. Capacity, 100,000 lbs. Weight, 44,300 lbs. Length, 36 ft. American Car & Foundry Co., Builders.

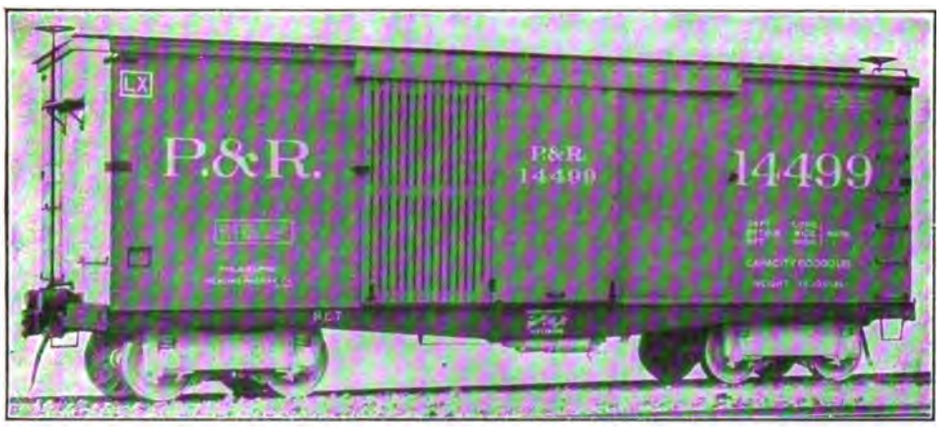


Fig. 2. Box Car, Pressed Steel Underframe. Capacity, 60,000 lbs. Weight, 32,300 lbs. Length, 34 ft. Pressed Steel Car Co., Builders.

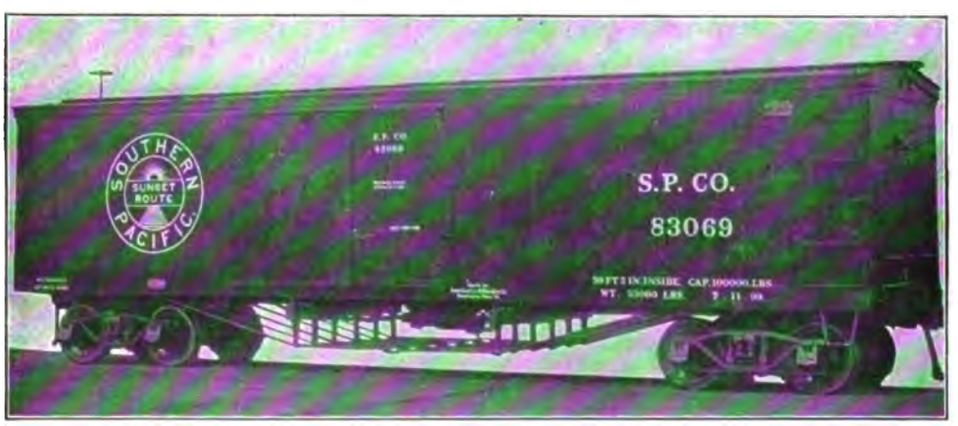


Fig. 3. Box Car, Canda Patent. Capacity, 100,000 lbs. Weight, 33,000 lbs. Length, 39 ft. 5 in. American Car & Foundry Co., Builders.

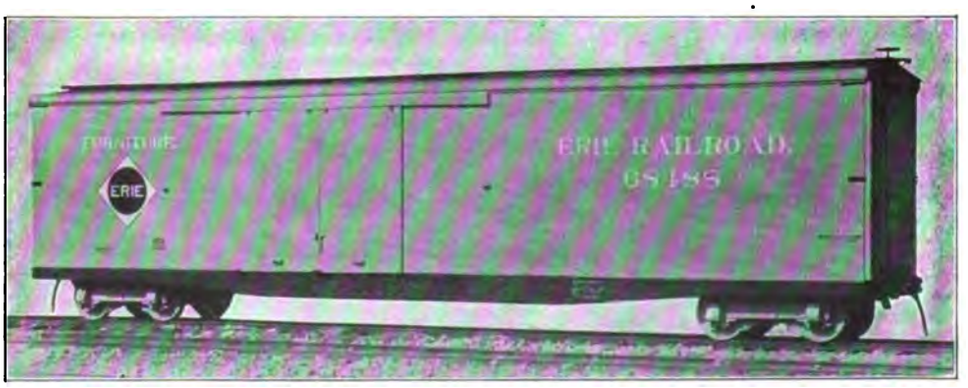


Fig. 4. Furniture Car, Pressed Steel Underframe. Capacity, 60,000 lbs. Weight, 44,000 lbs. Length, 50 ft. Pressed Steel Car Co., Builders.

FIG. 5. BOX CAR, STRUCTURAL STEEL UNDERFRAME. CAPACITY, 90,000 LBS. WEIGHT, 39,750 LBS. LENGTH, 40 FT. AMERICAN CAR & FOUNDRY CO., BUILDERS.

FIG. 6. PRODUCE CAR. CAPACITY, 60,000 LBS. WEIGHT, 38,500 LBS. LENGTH, 34 FT. AMERICAN CAR & FOUNDRY CO., BUILDERS.

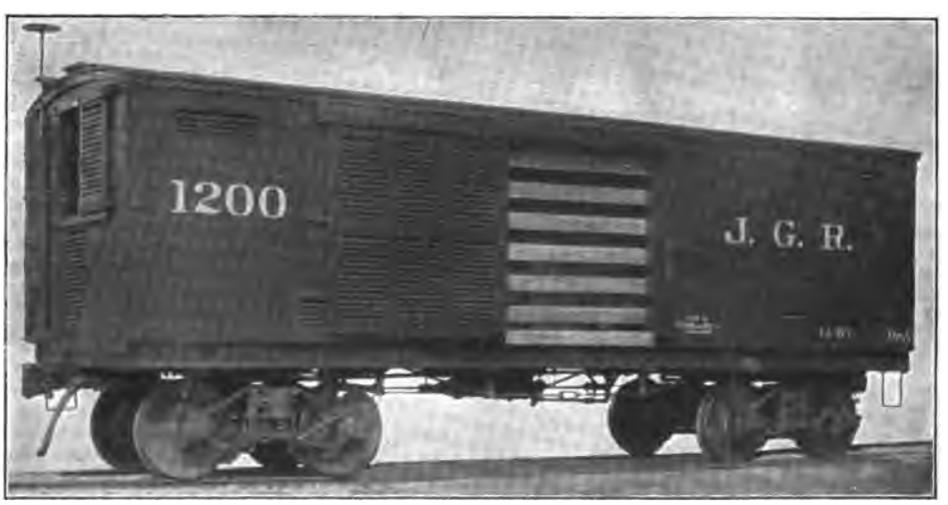


FIG. 7. VENTILATED FRUIT CAR, STRUCTURAL STEEL UNDERFRAME. ALLISON MANUFACTURING CO., BUILDERS.

Fig. 8. Refrigerator Car, Bowen Patent.
American Car & Foundry Co., Builders.

Fig. 9. Combined Refrigerator and Ventilator Car, Double Insulation.
Capacity, 60,000 lbs. Weight, 34,800 lbs. Length, 40 ft.
American Car & Foundry Co., Builders.

Fig. 10. Combined Ventilator and Refrigerator Car, Duplex Tanks.
Capacity, 50,000 lbs. Weight, 35,500 lbs.
American Car & Foundry Co., Builders.

FIG. 11. FRUIT VENTILATOR AND REFRIGERATOR CAR. CAPACITY, 50,000 LBS. WEIGHT, 36,200 LBS.
AMERICAN CAR & FOUNDRY CO., BUILDERS.

FIG. 12. REFRIGERATOR CAR. CAPACITY, 50,000 LBS. WEIGHT, 35,300 LBS.
AMERICAN CAR & FOUNDRY CO., BUILDERS.

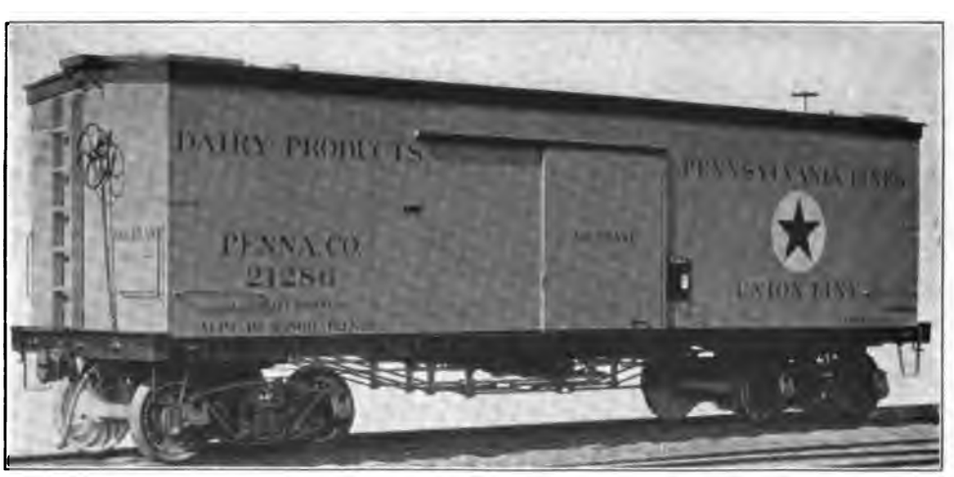


FIG. 13. REFRIGERATOR CAR FOR DAIRY PRODUCTS. CAPACITY, 70,000 LBS. WEIGHT, 45,800 LBS.
AMERICAN CAR & FOUNDRY CO., BUILDERS.

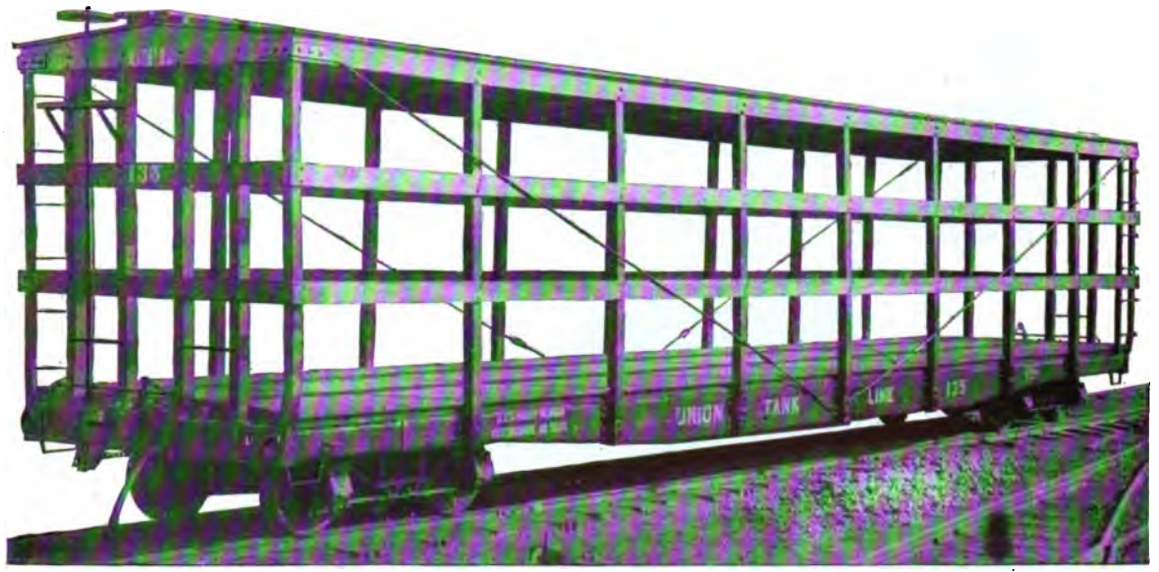


Fig. 14. Barrel Rack for Empty Barrels. Pressed Steel Car Co., Builders.

Fig. 15. Flat Car. Capacity, 80,000 lbs. Weight, 27,200 lbs. Length, 41 ft.
American Car & Foundry Co., Builders.

Fig. 16. Flat Car, Structural Steel Underframe. Capacity, 100,000 lbs.
Cambria Steel Co., Builders.

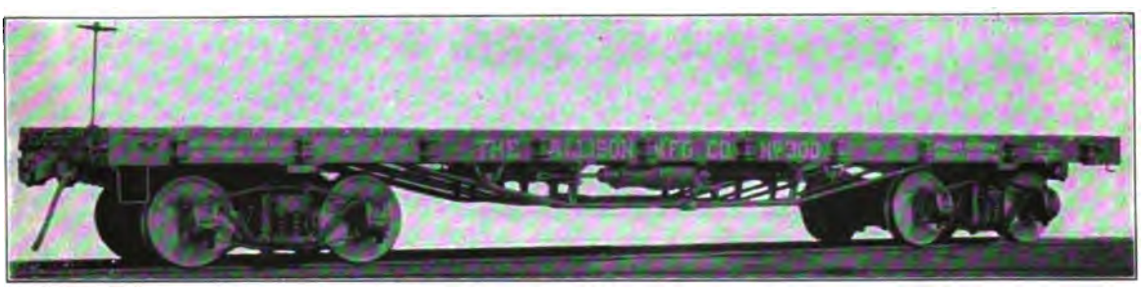


Fig. 17. Flat Car. Capacity, 100,000 lbs. Weight, 34,600 lbs.
Allison Manufacturing Co., Builders.

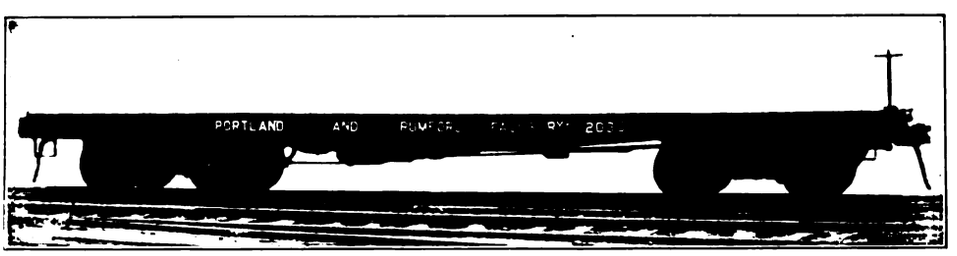


Fig. 18. Flat Car, Pressed Steel Underframe. Capacity, 100,000 lbs. Weight, 29,600 lbs.
Pressed Steel Car Co., Builders.

Fig. 19. Flat Car, Structural Steel Underframe. Capacity, 100,000 lbs. Weight, 27,800 lbs.
American Car & Foundry Co., Builders.

Fig. 20. Flat Car. Capacity, 60,000 lbs. Weight, 24,800 lbs. Length, 35 ft.
American Car & Foundry Co., Builders.

Fig. 21. Gondola Car, Drop Bottom, Structural Steel. Capacity, 110,000 lbs. Weight, 36,500 lbs.
American Car & Foundry Co., Builders.

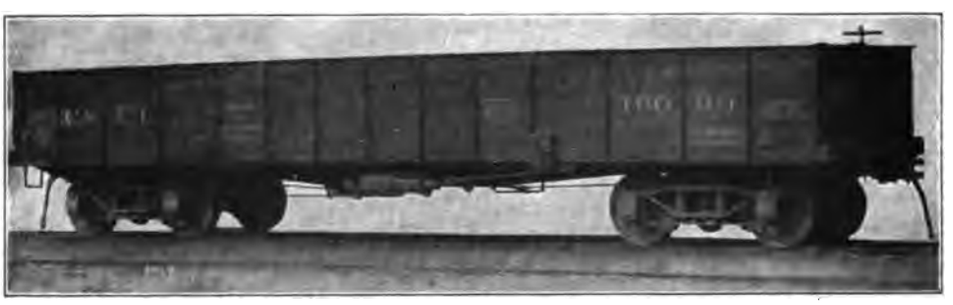


Fig. 22. Gondola Car, Flat Bottom, Pressed Steel. Capacity, 80,000 lbs. Weight, 32,800 lbs.
Pressed Steel Car Co., Builders.

Fig. 23. Gondola Car, Hopper Bottom, Pressed Steel. Capacity, 80,000 lbs. Weight, 33,500 lbs.
Pressed Steel Car Co., Builders.

Fig. 24. Low Side Gondola Car for Steel Billets, Structural Steel. Capacity, 100,000 lbs.
Cambria Steel Co., Builders.

Fig. 25. Gondola Car, Flat Bottom, Structural Steel. Capacity, 100,000 lbs.
Cambria Steel Co., Builders.

Fig. 26. Gondola Car, Drop Bottom, Structural Steel. Capacity, 100,000 lbs. Weight, 36,700 lbs.
American Car & Foundry Co., Builders.

Fig. 27. Gondola Car, Drop Ends, Pressed Steel Underframe. Capacity, 100,000 lbs. Weight, 44,500 lbs.
Pressed Steel Car Co., Builders.

Fig. 28. Gondola Car with Inside Stakes. Capacity, 80,000 lbs.
Middletown Car Works, Builders.

Fig. 29. Gondola Car, Fixed Ends. Capacity, 60,000 lbs. Weight, 28,400 lbs.
American Car & Foundry Co., Builders.

Fig. 30. Side Dump Coal Car, Pratt Patent. Capacity, 60,000 lbs. Weight, 27,200 lbs.
American Car & Foundry Co., Builders.

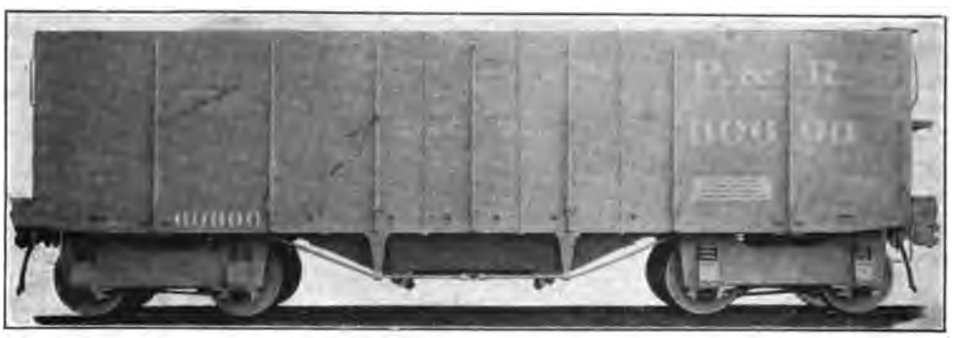


Fig. 31. Gondola Car, Hopper Bottom. Capacity, 80,000 lbs.
Middletown Car Works, Builders.

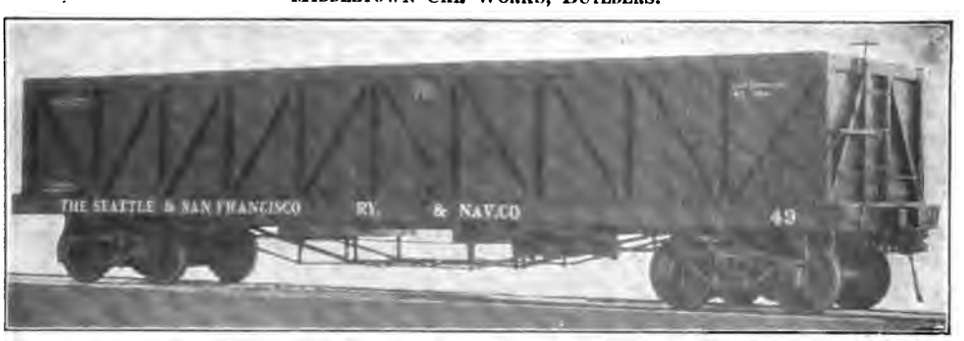


Fig. 32. Gondola Car, High Side, Drop Bottom, Canda Patent. Capacity, 100,000 lbs. Weight, 35,200 lbs.
American Car & Foundry Co., Builders.

Fig. 33. Ingoldsby Dump Car, Wood Construction. Capacity, 100,000 lbs. Weight, 39,400 lbs.
American Car & Foundry Co., Builders.

Fig. 34. Gondola Car, High Side, Hopper Bottom. Capacity, 80,000 lbs. Weight, 35,200 lbs.
American Car & Foundry Co., Builders.

Fig. 35. Gondola Car, High Side, Hopper Bottom. Capacity, 60,000 lbs. Weight, 28,600 lbs.
American Car & Foundry Co., Builders.

Fig. 36. Gondola Car, High Side, Hopper Bottom, for Coal. Capacity, 80,000 lbs. Weight, 34,500 lbs.
Pullman Company, Builders.

Fig. 37. Gondola Car, Double Hopper Bottom. Capacity, 80,000 lbs. Weight, 32,200 lbs.
American Car & Foundry Co., Builders.

FIG. 38. GONDOLA CAR, COMPOSITE WOOD AND STEEL FRAMING. CAPACITY, 80,000 LBS. WEIGHT, 33,700 LBS.

FIG. 39. GONDOLA CAR WITH COKE RACK, INSIDE STAKES. CAPACITY, 80,000 LBS.
MIDDLETOWN CAR WORKS, BUILDERS.

FIG. 40. INGOLDSBY DUMP CAR, STRUCTURAL STEEL. CAPACITY, 100,000 LBS.
AMERICAN CAR & FOUNDRY CO., BUILDERS.

FIG. 41. HOPPER CAR, PRESSED STEEL. CAPACITY, 100,000 LBS. WEIGHT, 34,200 LBS.
PRESSED STEEL CAR CO., BUILDERS.

FIG. 42. HOPPER CAR, STRUCTURAL STEEL, VANDERBILT PATENT. CAPACITY, 100,000 LBS. WEIGHT, 36,800 LBS.
CAMBRIA STEEL CO., BUILDERS.

FIG. 43. CENTER DUMP BALLAST CAR, PRESSED STEEL. CAPACITY, 100,000 LBS. WEIGHT, 38,000 LBS.
PRESSED STEEL CAR CO., BUILDERS.

FIG. 44. HOPPER ORE CAR, PRESSED STEEL. CAPACITY, 100,000 LBS.
PRESSED STEEL CAR CO., BUILDERS.

FIG. 45. HOPPER CAR, PRESSED STEEL. CAPACITY, 100,000 LBS. WEIGHT, 36,750 LBS.
PRESSED STEEL CAR CO., BUILDERS.

Fig. 46. Hopper Car, Drop Doors, Structural Steel. Capacity, 110,000 lbs. Weight, 38,500 lbs.
American Car & Foundry Co., Builders.

Fig. 47. Rodger Ballast Car, Center Dump. Capacity, 100,000 lbs. Weight, 37,500 lbs.
Rodger Ballast Car Co., Builders.

Fig. 48. Rodger Convertible Car.
Rodger Ballast Car Co., Builders.

Fig. 49. Contractor's Tip Car.
Kilbourne & Jacobs, Builders.

Fig. 50. Ballast Plow, Steel Frame. Rodger Ballast Car Co., Builders.

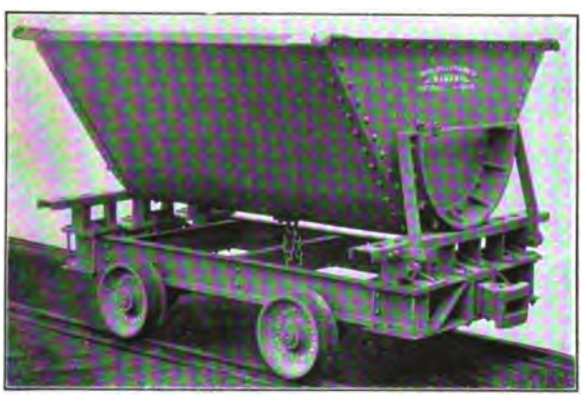


Fig. 51. Steel Tip Car.
Russell Wheel & Foundry Co., Builders.

Fig. 52. Side Dump Tip Car.
Russell Wheel & Foundry Co., Builders.

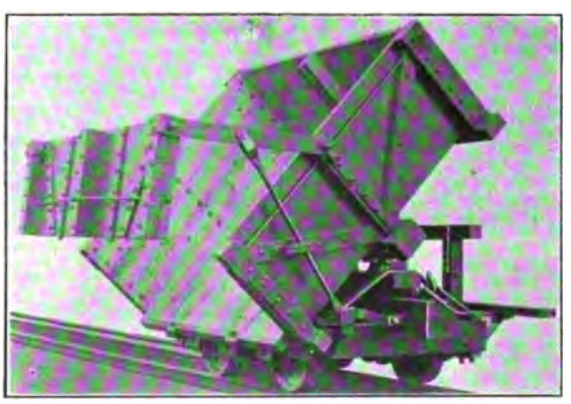


Fig. 53. Side Dump Tip Car.
Allison Manufacturing Co., Builders.

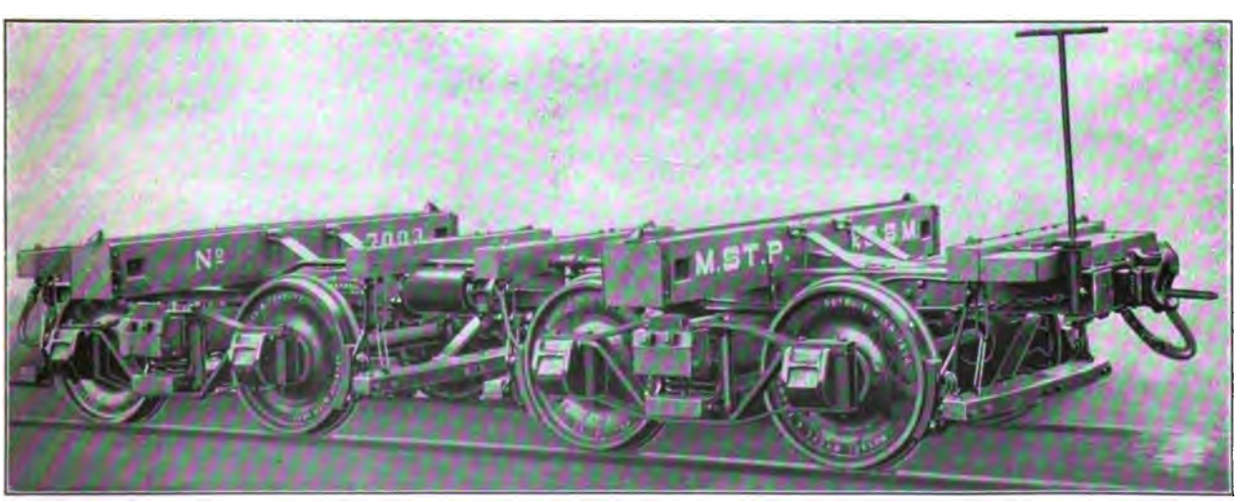


Fig. 54. Logging Car. Russell Wheel & Foundry Co., Builders.

FIG. 55. LOGGING CAR. SHEFFIELD CAR CO., BUILDERS.

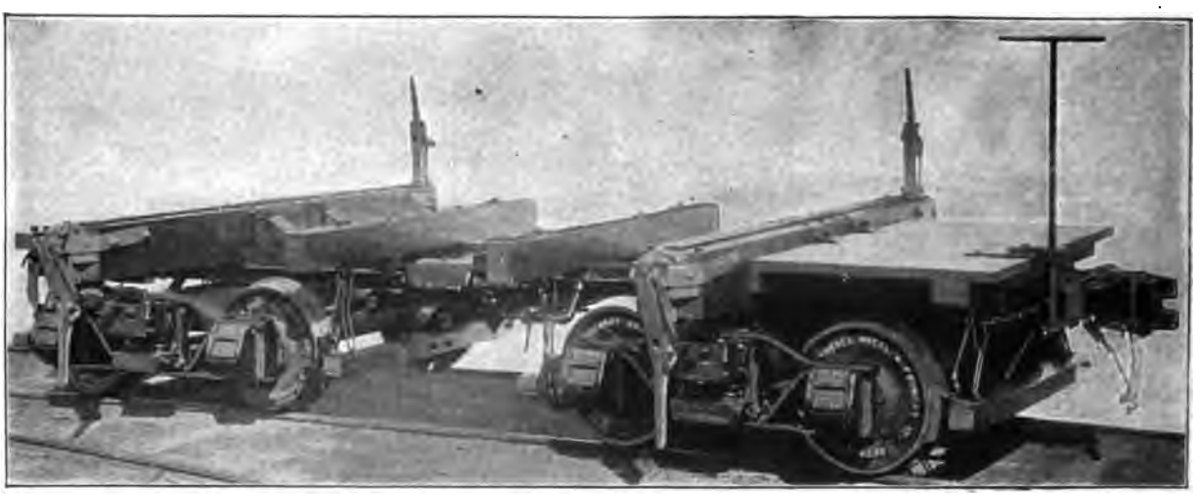


FIG. 56. LOGGING CAR WITH WALL PATENT DROP STAKES.
RUSSELL WHEEL & FOUNDRY CO., BUILDERS.

FIG. 57. STOCK CAR. CAPACITY, 56,000 LBS. WEIGHT, 32,100 LBS. LENGTH, 36 FT. 6 IN.
WESTERN STEEL CAR & FOUNDRY CO., BUILDERS.

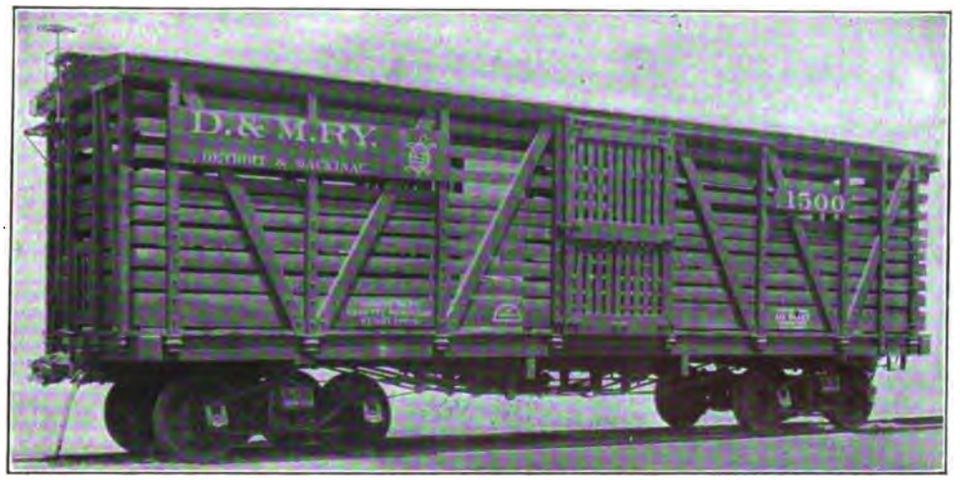


FIG. 58. STOCK CAR. CAPACITY, 60,000 LBS. WEIGHT, 30,600 LBS. LENGTH, 36 FT. BARNEY & SMITH CAR CO., BUILDERS.

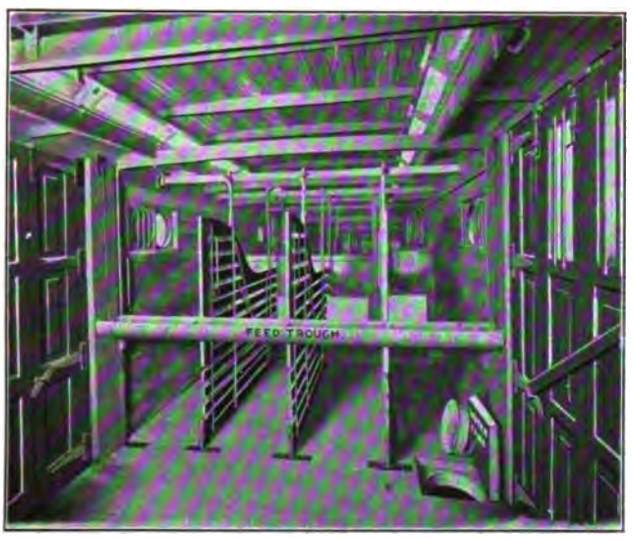


FIG. 59. INTERIOR OF "PERFECTED" CAR SHOWING STALL PARTITIONS IN POSITION FOR FOUR HORSES.

FIG. 60. INTERIOR OF "PERFECTED" CAR SHOWING STALL PARTITIONS SHIFTED TO ONE SIDE.

FIG. 61. ARMS (BURTON) "PERFECTED" HORSE CAR. CAPACITY, 16 HORSES.

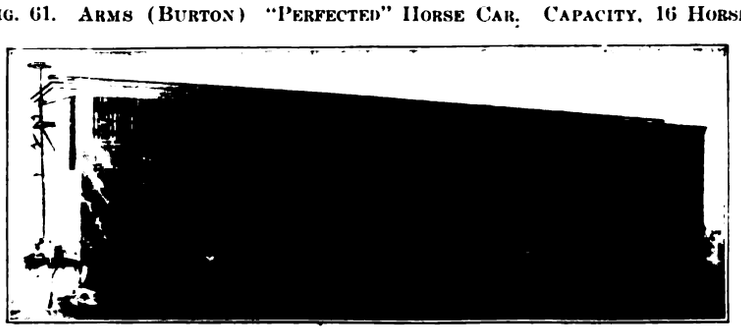


FIG. 62. ARMS CROSS STALL HORSE CAR. 18 STALLS.

Fig. 63. Eight Wheel Caboose, with Lookout and Toolbox.

Fig. 64. Four Wheel Caboose with Lookout.

Fig. 65. Eight Wheel Caboose, with Lookout and Side Door.

FIG. 66. EIGHT WHEEL CABOOSE, WITH LOOKOUT AND TOOLBOX.

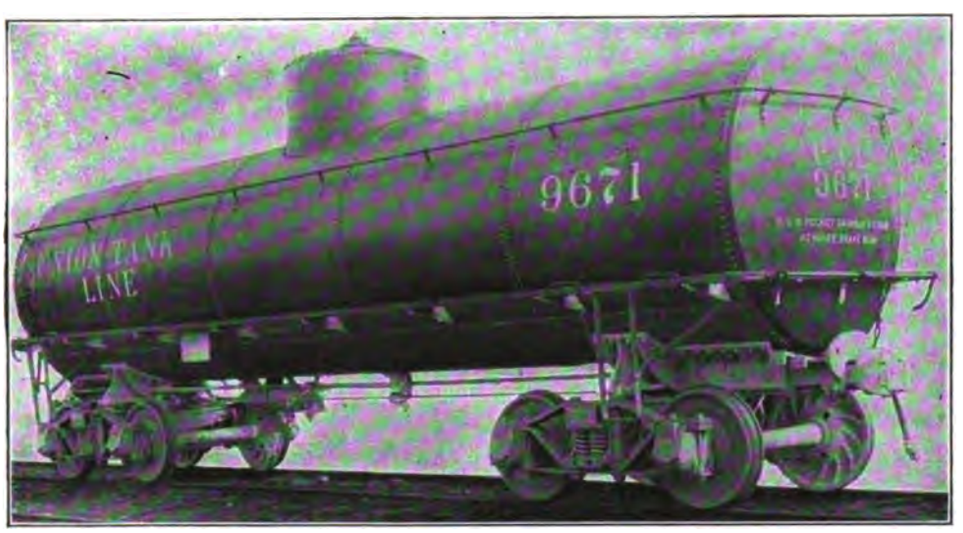


FIG. 67. TANK CAR, VAN DYKE PATENT. CAPACITY, 10,000 GALS.
The bottom sheet is reinforced and no sills are used, the tank being riveted to the saddles over the trucks.

FIG. 68. TANK CAR, VANDERBILT PATENT. CAPACITY, 12,000 GALS. OR 100,000 LBS. WEIGHT, 36,600 LBS.
AMERICAN STEEL FOUNDRY CO., BUILDERS.

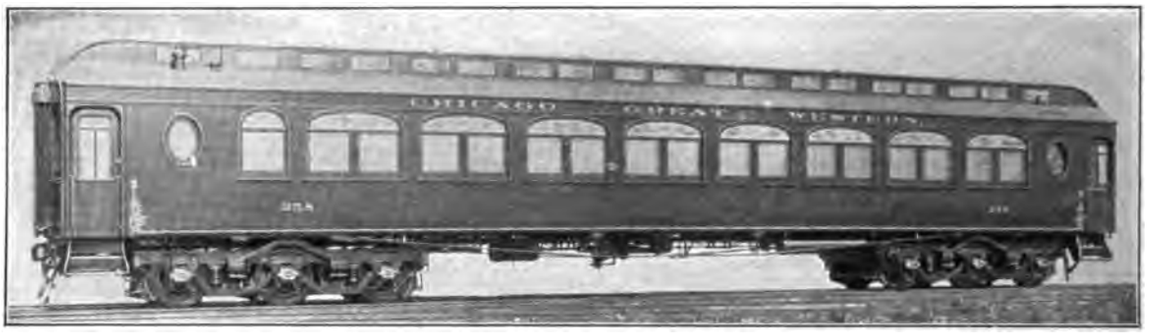


FIG. 69. FIRST CLASS VESTIBULED COACH. CHICAGO GREAT WESTERN.
PULLMAN CO., BUILDERS

FIG. 70. INTERIOR OF FIRST CLASS COACH.
C., R. I. & P. BARNEY & SMITH, BUILDERS.

FIG. 71. INTERIOR FIRST CLASS COACH.
C. R. R. OF N. J. HARLAN & HOLLINGSWORTH, BUILDERS.

FIG. 72. INTERIOR OF CHAIR CAR.
C., R. I. & P. BARNEY & SMITH, BUILDERS.

FIG. 73. INTERIOR OF SMOKING COMPARTMENT,
COMBINATION SMOKING AND BAGGAGE CAR.
C., C., C. & ST. L. BARNEY & SMITH, BUILDERS.

FIG. 74. COMBINATION BAGGAGE AND SMOKING CAR. C., C., C. & ST. L.
BARNEY & SMITH, BUILDERS.

FIGS. 75 AND 76. INTERIORS OF FIRST CLASS COACHES.

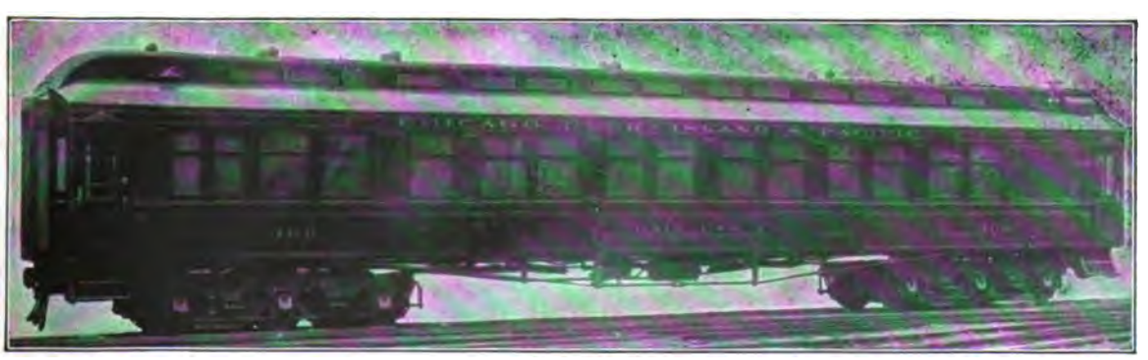


FIG. 77. CHAIR CAR. C., R. I. & P. BARNEY & SMITH, BUILDERS.

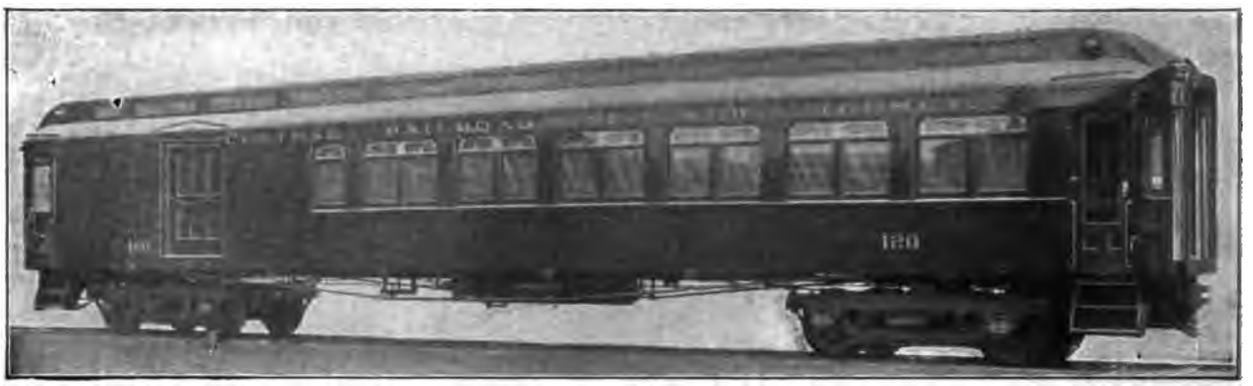


FIG. 78. COMBINATION SMOKING AND BAGGAGE CAR. C. R. R. OF N. J.
HARLAN & HOLLINGSWORTH, BUILDERS.

FIG. 79. INTERIOR OF FIRST CLASS COACH.

FIG. 80. INTERIOR OF CAR FOR ELEVATED ROADS.
CHICAGO & SOUTH SIDE RAPID TRANSIT RAILROAD.

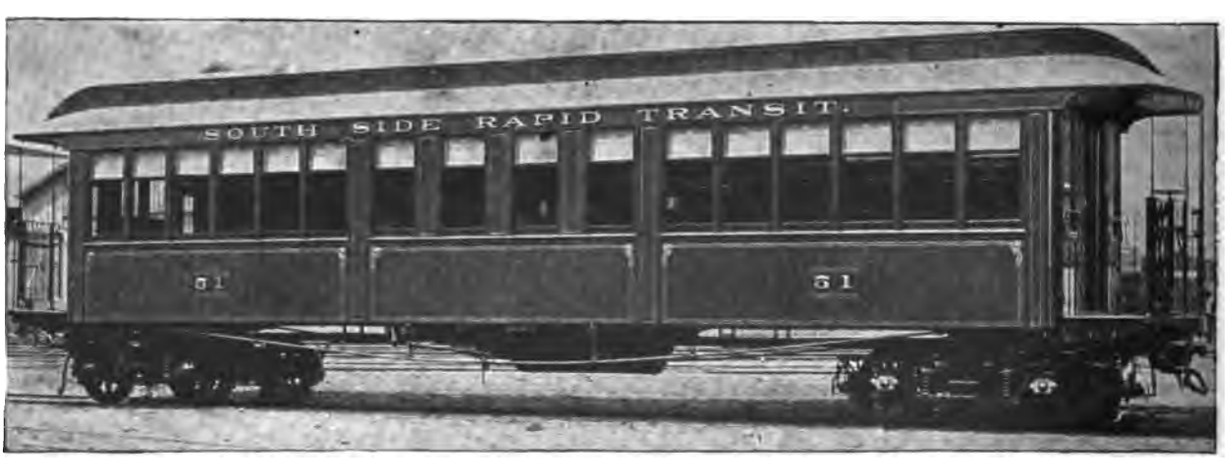


FIG. 81. COACH FOR ELEVATED ROADS. CHICAGO & SOUTH SIDE RAPID TRANSIT RAILROAD.

FIG. 82. DINING CAR. C., M. & ST. P. BARNEY & SMITH, BUILDERS.

FIG. 83. INTERIOR, DINING CAR, "MANHATTAN." PULLMAN CO., BUILDERS.

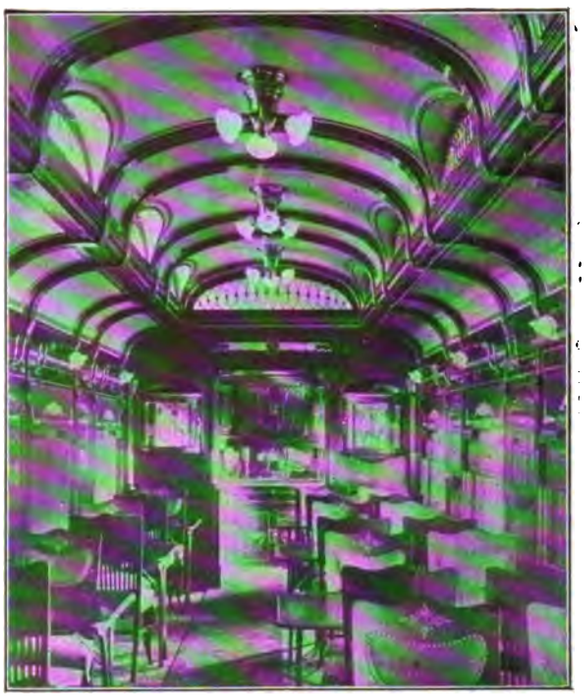


FIG. 84. INTERIOR OF DINING CAR. C., M. & ST. P. BARNEY & SMITH, BUILDERS.

 FIGS. 85 AND 86. INTERIOR OF DINING CAR. ERIE R. R. BARNEY & SMITH, BUILDERS.

FIG. 87. DINING CAR, "MANHATTAN." PULLMAN CO., BUILDERS.

FIG. 88. OBSERVATION ROOM, OBSERVATION SLEEPING CAR, "BEN CRUACHAN." PULLMAN CO., BUILDERS.

FIG. 89. INTERIOR OF PARLOR CAR, "ALBERTA." PULLMAN CO., BUILDERS.

FIG. 90. INTERIOR OF PARLOR CAR. PERE MARQUETTE R. R. Acetylene Gas Equipment.

FIG. 91. PARLOR CAR, "ALBERTA." PULLMAN CO., BUILDERS.

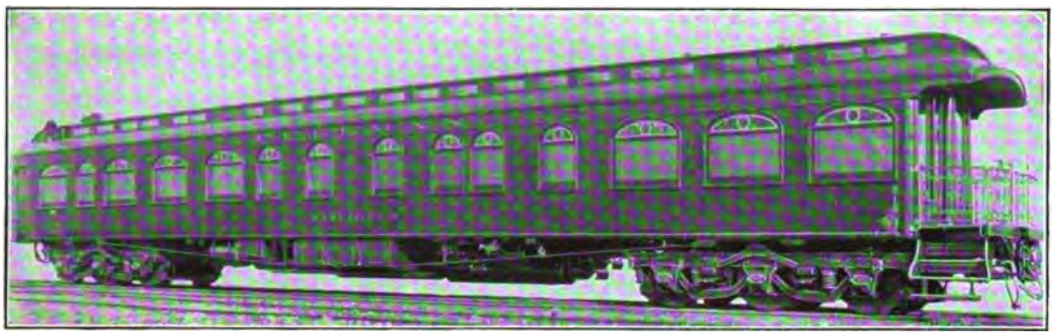


FIG. 92. PRIVATE CAR, "MAYFLOWER." PULLMAN CO., BUILDERS.

FIG. 93. DINING AND OBSERVATION ROOM, PRIVATE CAR, "MAYFLOWER." PULLMAN CO., BUILDERS.

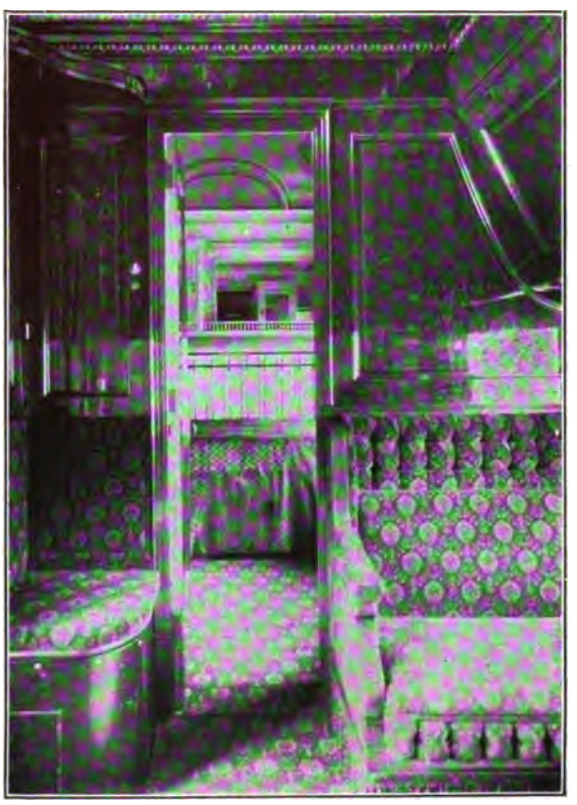


FIG. 94. INTERIOR OF STATEROOM, PRIVATE CAR, "MAYFLOWER." PULLMAN CO., BUILDERS.

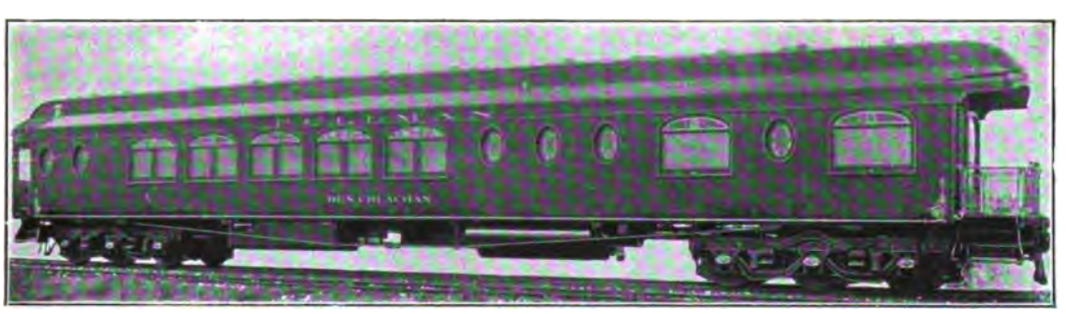


FIG. 95. OBSERVATION SLEEPING CAR, "BEN CRUACHAN." PULLMAN CO., BUILDERS.

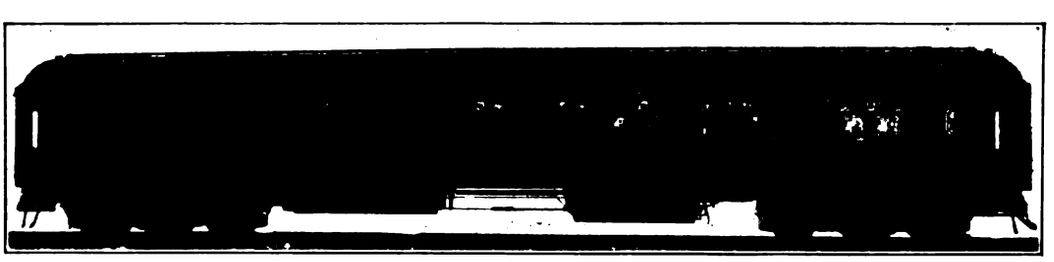


FIG. 96. TWELVE SECTION SLEEPING CAR, "GRAFTON." PULLMAN CO., BUILDERS.

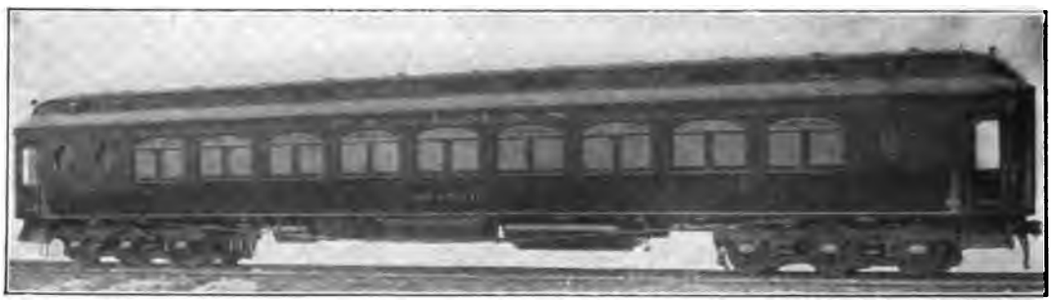


FIG. 97. COMPARTMENT SLEEPING CAR, "BRAZITO." PULLMAN CO., BUILDERS.

FIG. 98. CORRIDOR, COMPARTMENT SLEEPING CAR, "BRAZITO." PULLMAN CO., BUILDERS.

FIG. 99. INTERIOR, COMPARTMENT SLEEPING CAR, "BRAZITO." PULLMAN CO., BUILDERS.

FIG. 100. INTERIOR OF SLEEPING CAR, "GRAFTON." PULLMAN CO., BUILDERS.

FIG. 101. INTERIOR OF OBSERVATION SLEEPING CAR, "BEN CRUACHAN." PULLMAN CO., BUILDERS.

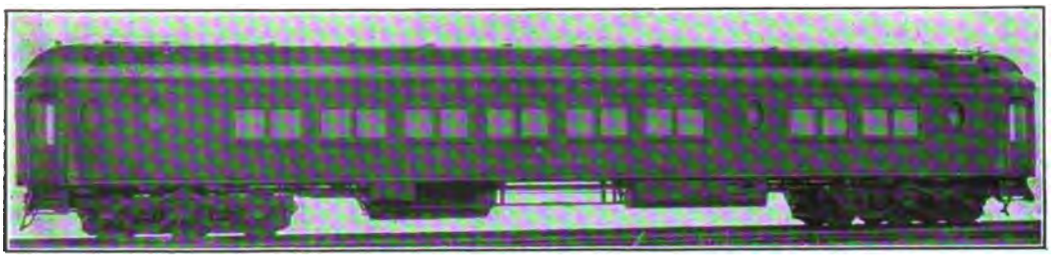


FIG. 102. SLEEPING CAR, "FRANCISCO." PULLMAN CO., BUILDERS.

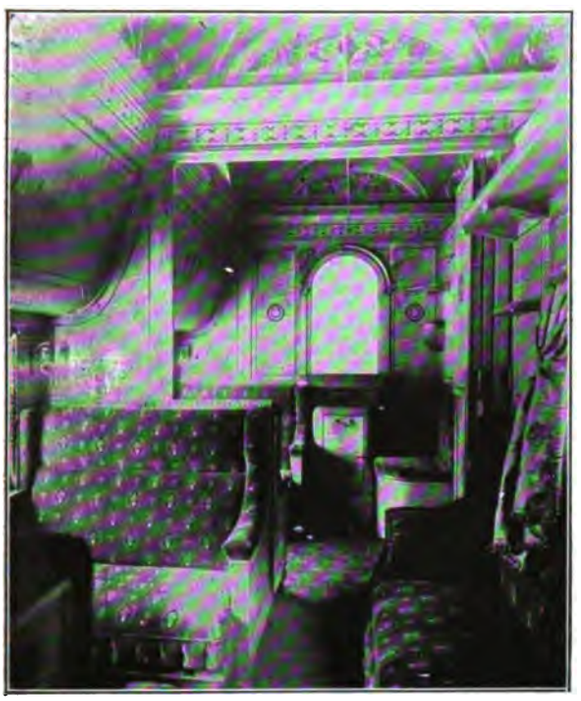


FIG. 103. DOUBLE STATEROOM, SLEEPING CAR, "FRANCISCO." PULLMAN CO., BUILDERS.

FIG. 104. INTERIOR OF SLEEPING CAR, "GLENWOOD," M., ST. P. & S. S. M. BARNEY & SMITH, BUILDERS.

FIG. 105. SLEEPING CAR, "GLENWOOD," M., ST. P. & S. S. M. BARNEY & SMITH, BUILDERS.

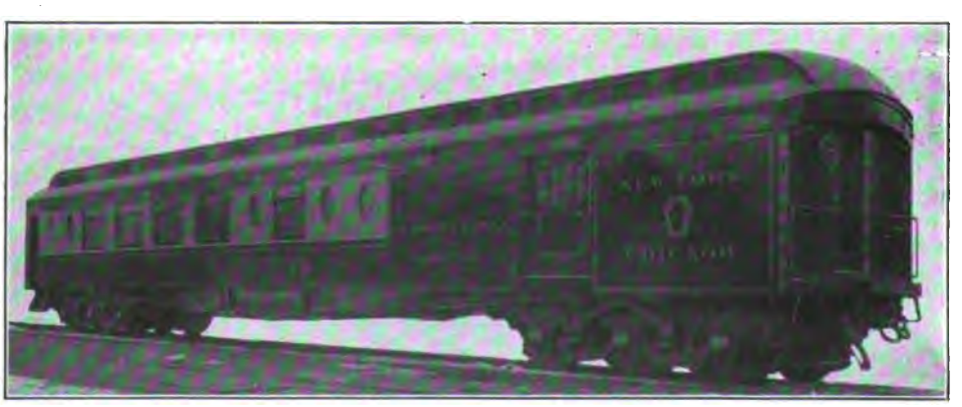


FIG. 106. COMBINATION LIBRARY, BUFFET AND BAGGAGE CAR, "ULYSSES," PENNSYLVANIA LIMITED. PULLMAN CO., BUILDERS.

FIG. 107. LIBRARY AND SMOKING COMPARTMENT, COMBINATION CAR, "ULYSSES," PENNSYLVANIA LIMITED. PULLMAN CO., BUILDERS.

FIG. 108. BUFFET COMPARTMENT, COMBINATION CAR, "ULYSSES," PENNSYLVANIA LIMITED. PULLMAN CO., BUILDERS.

FIG. 109. BAGGAGE COMPARTMENT COMBINATION CAR, "ULYSSES," PENNSYLVANIA LIMITED. PULLMAN CO., BUILDERS.

FIG. 110. INTERIOR OF TOURIST SLEEPING CAR. PULLMAN CO., BUILDERS.

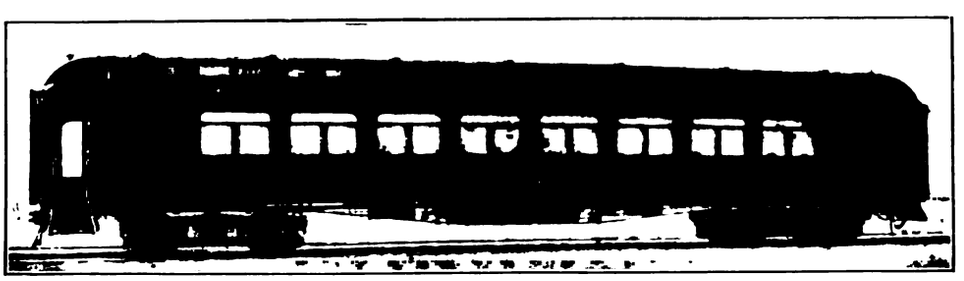


FIG. 111. TOURIST SLEEPING CAR. PULLMAN CO., BUILDERS.

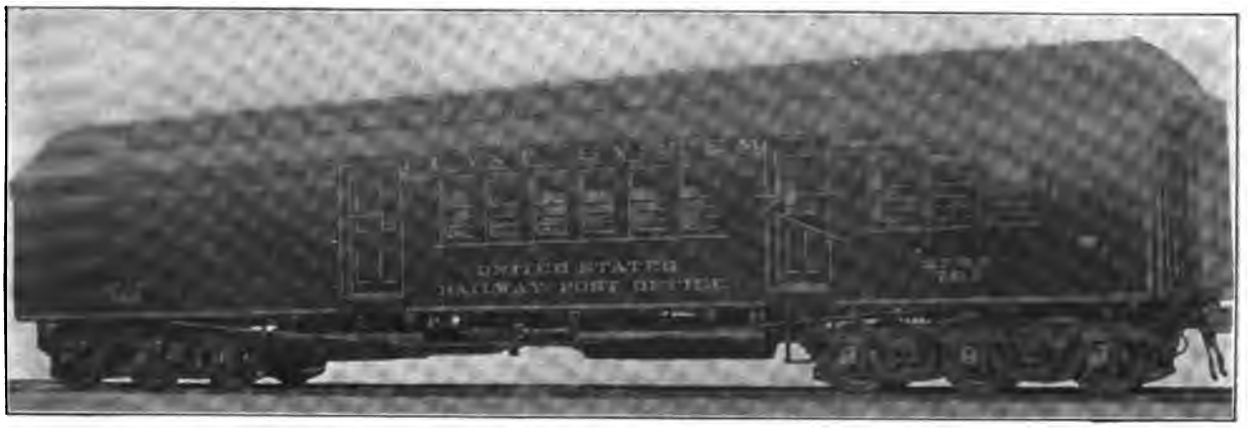


Fig. 112. Postal Car, Plant System. Harlan & Hollingsworth, Builders.

Fig. 113. Interior of Postal Car. C., H. & D. Barney & Smith, Builders.

Fig. 114. Interior of Postal Car. D., L. & W. Barney & Smith, Builders.

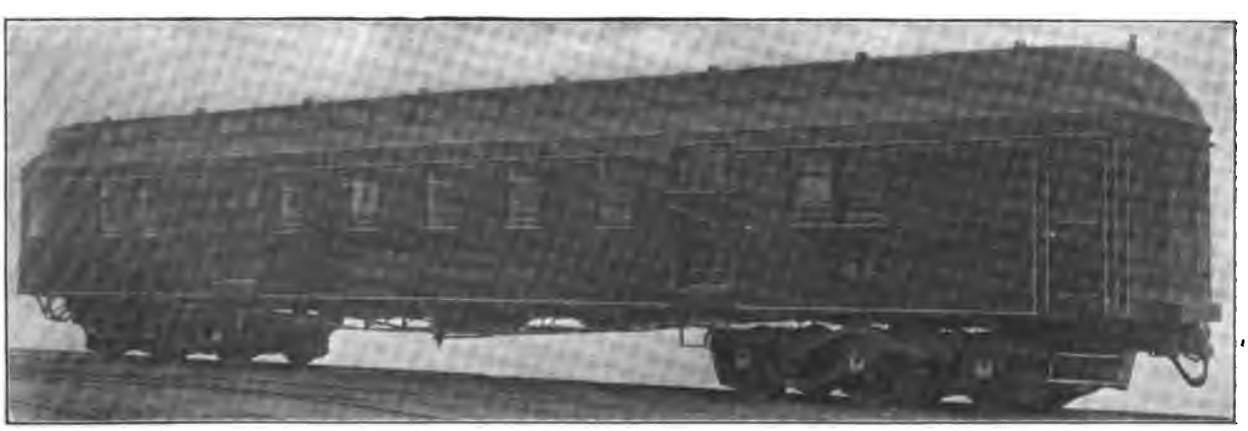


Fig. 115. Postal Car, Iowa Central. Harlan & Hollingsworth, Builders.

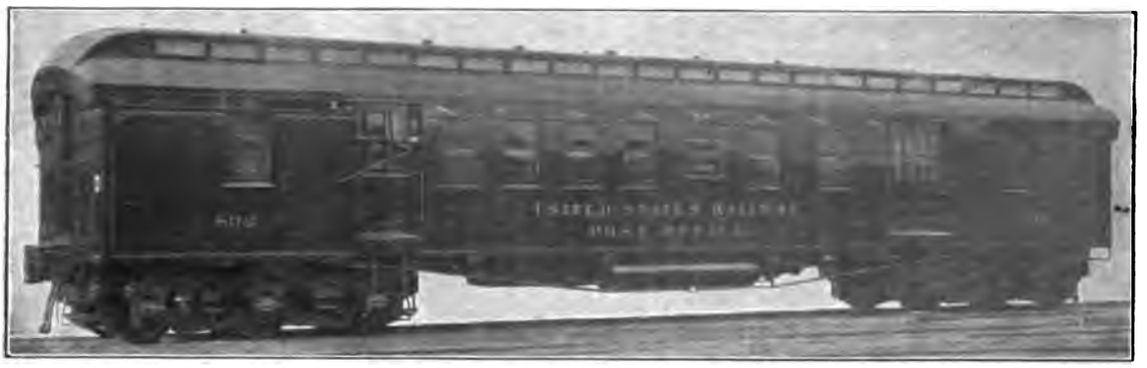


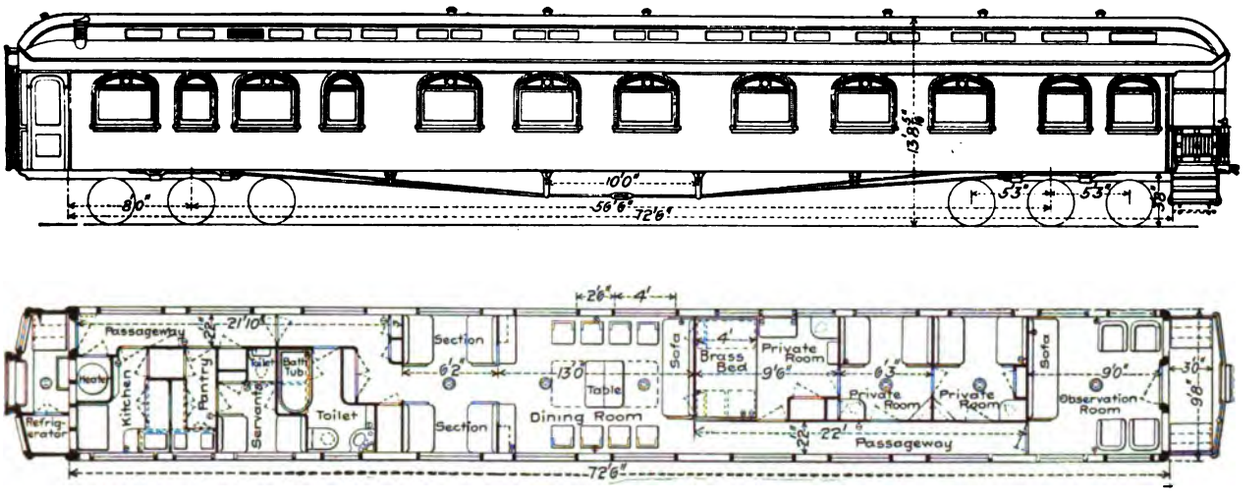
Fig. 116. Postal Car, D., L. & W. Barney & Smith, Builders.

Fig. 117. Interior, Postal Car.
Harlan & Hollingsworth, Builders.

Fig. 118. Interior of Postal Car.
Harlan & Hollingsworth, Builders.

Fig. 119. Postal Car, C., H. & D. Barney & Smith, Builders.

Fig. 120. Combination Baggage and Express Car, C., N. O. & T. P.
Barney & Smith, Builders.



FIGS. 121-122. PRIVATE CAR. PULLMAN CO., BUILDERS.

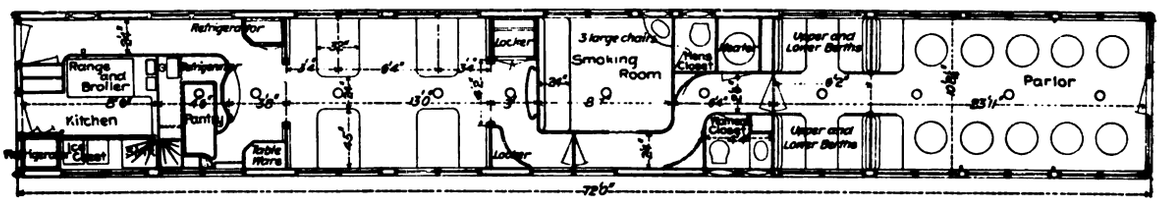


FIG. 123. CAFE PARLOR CAR, C., B. & Q. R. R. PULLMAN CO., BUILDERS.

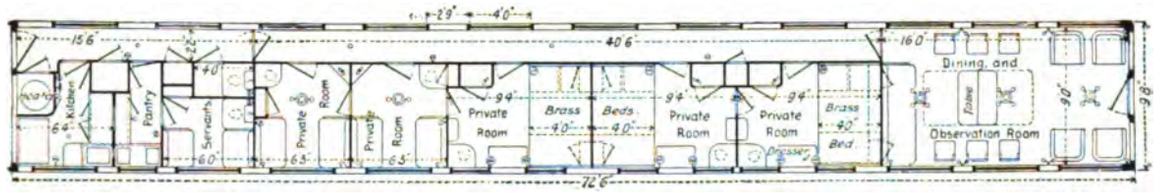


FIG. 124. PRIVATE CAR. PULLMAN CO., BUILDERS.

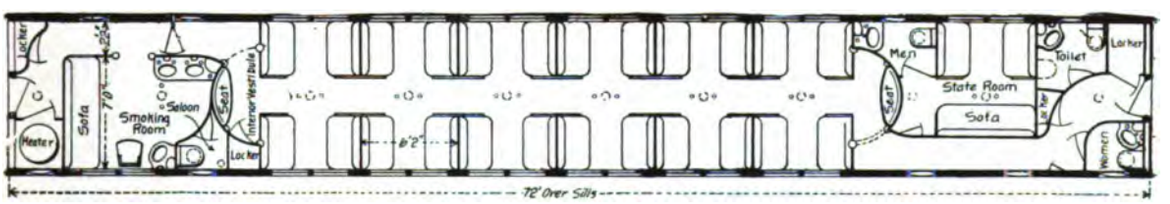


FIG. 125. SLEEPING CAR, M., ST. P. & S. ST. M. R. R. BARNEY & SMITH, BUILDERS.

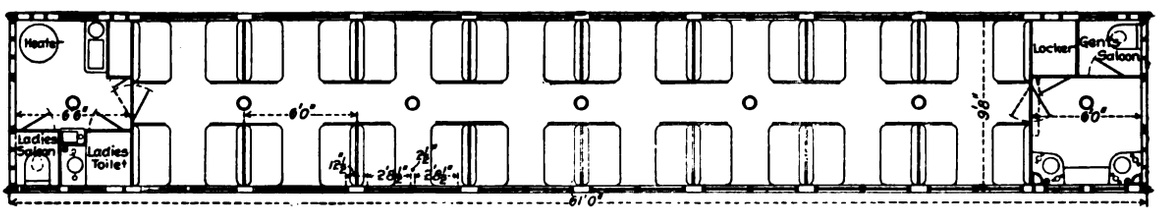


FIG. 126. TOURIST SLEEPING CAR. PULLMAN CO., BUILDERS.

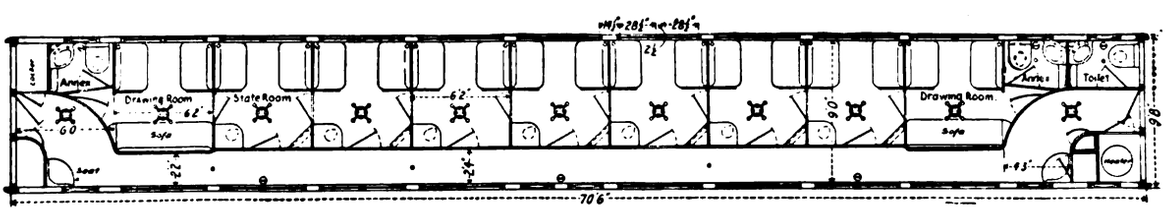


FIG. 127. COMPARTMENT SLEEPING CAR. PULLMAN CO., BUILDERS.

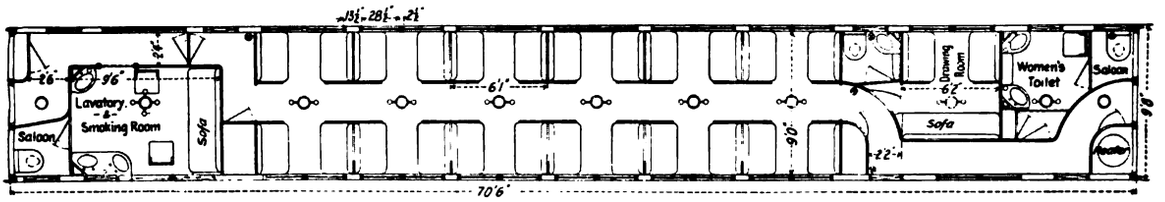


FIG. 128. SLEEPING CAR. PULLMAN CO., BUILDERS.

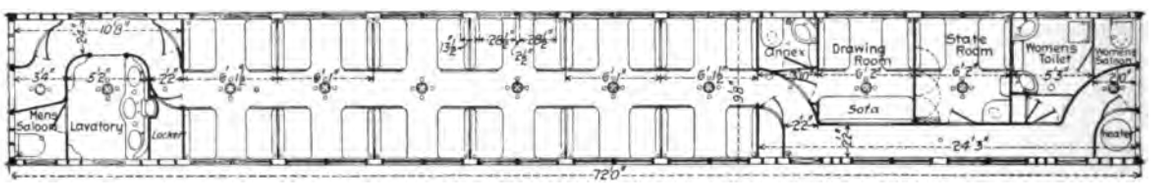


FIG. 129. SLEEPING CAR. PULLMAN CO., BUILDERS.

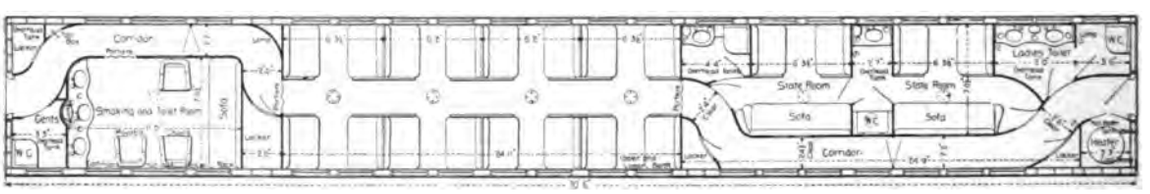


FIG. 130. SLEEPING CAR. CANADIAN PACIFIC.

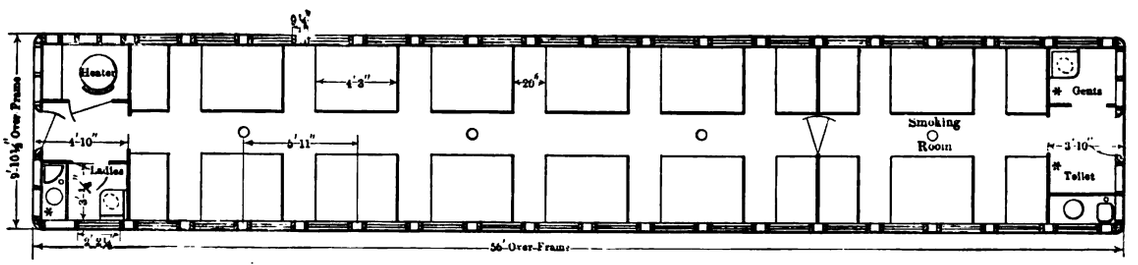


FIG. 131. TOURIST SLEEPING CAR. CANADIAN PACIFIC.

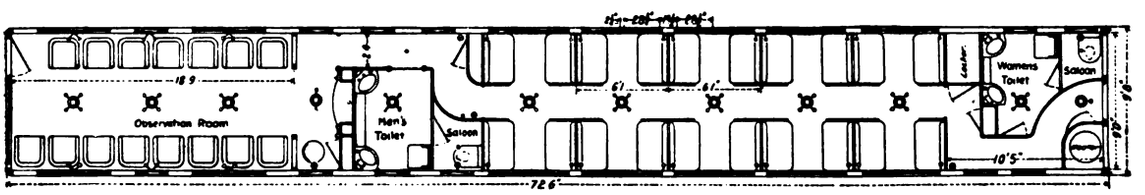


FIG. 132. OBSERVATION SLEEPING CAR. PULLMAN CO., BUILDERS.

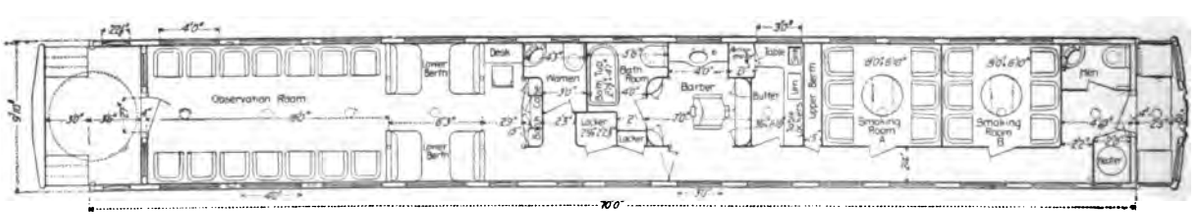


FIG. 133. OBSERVATION BUFFET CAR. NORTHERN PACIFIC. BARNEY & SMITH, BUILDERS.

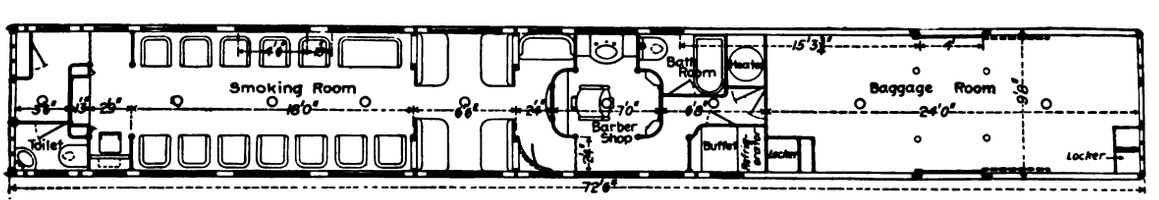


FIG. 134. COMPOSITE SMOKING AND BAGGAGE CAR. PULLMAN CO., BUILDERS.

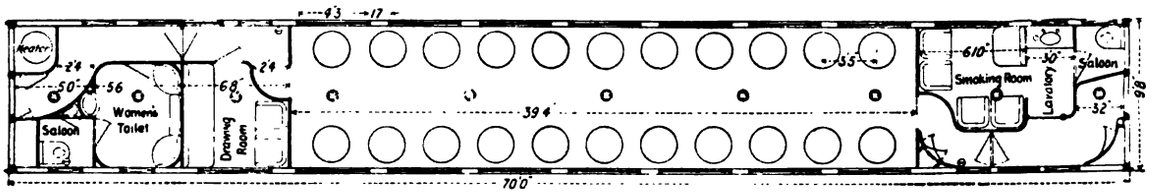


Fig. 135. Parlor Car. Pullman Co., Builders.

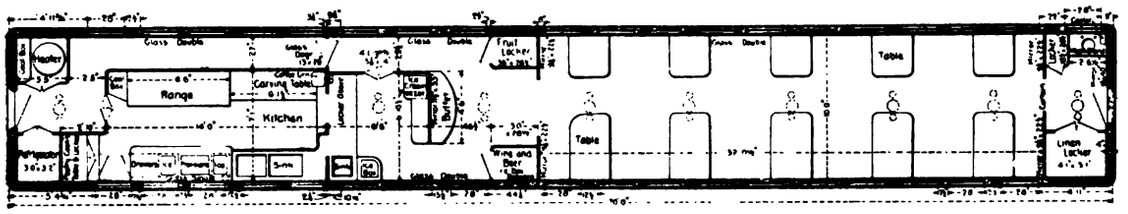


Fig. 136. Dining Car. C., C., C. & St. L.

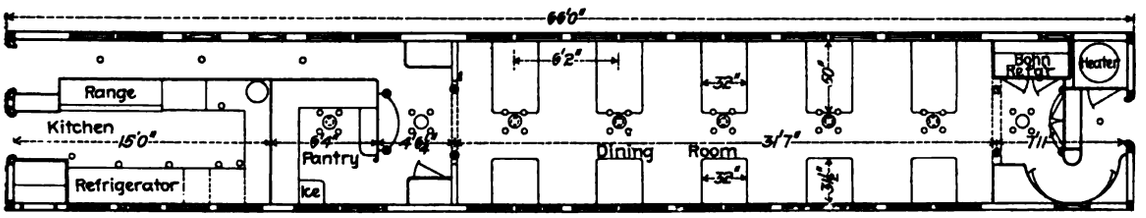


Fig. 137. Dining Car. C., B. & Q.

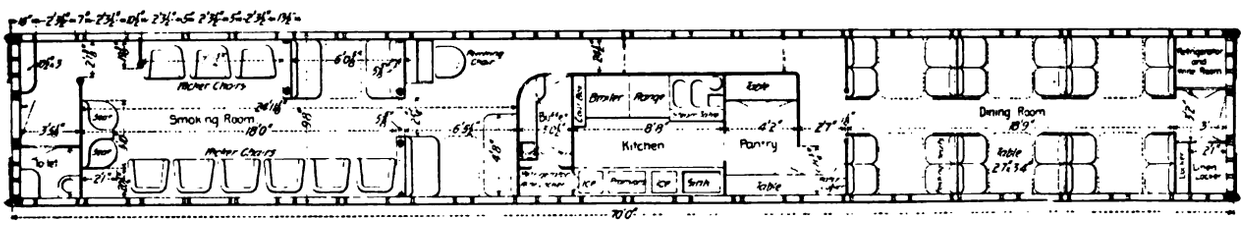


Fig. 138. Cafe Car. Erie R. R.

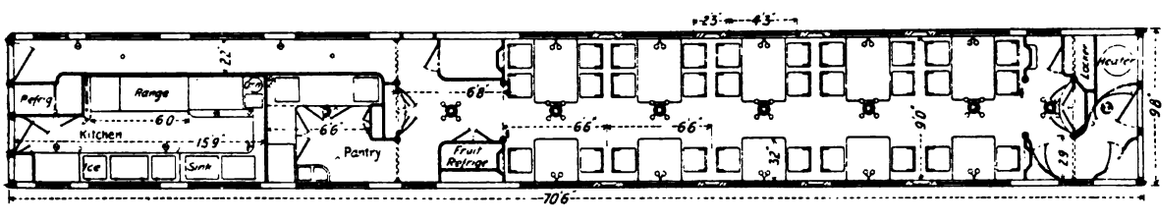


Fig. 139. Dining Car. Pullman Co., Builders.

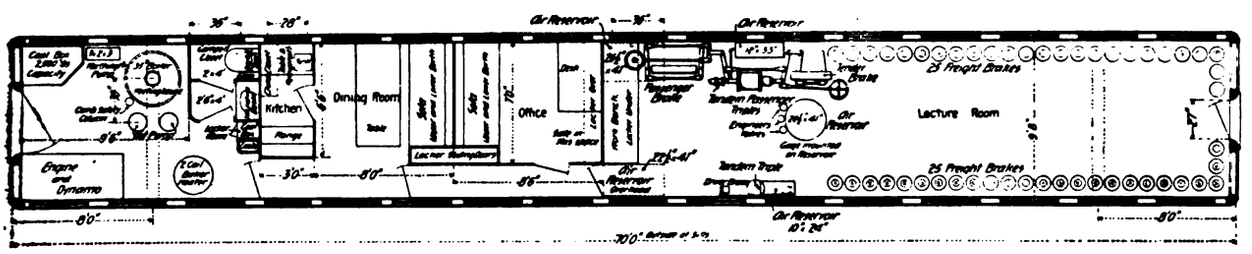


Fig. 140. Air-Brake Instruction Car. International Correspondence Schools.

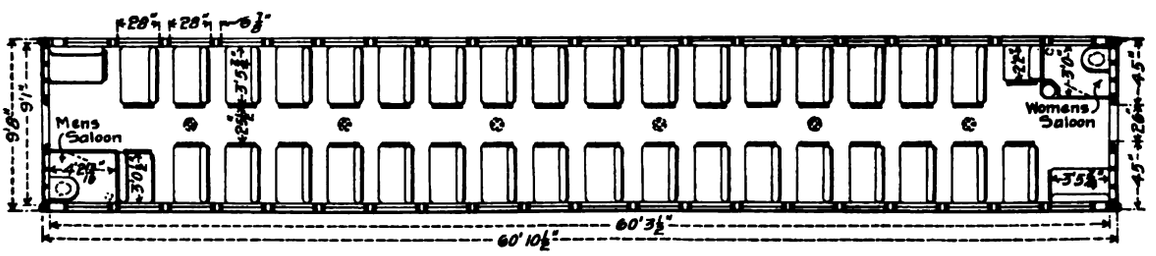


Fig. 141. Coach. N. Y., N. H. & H.

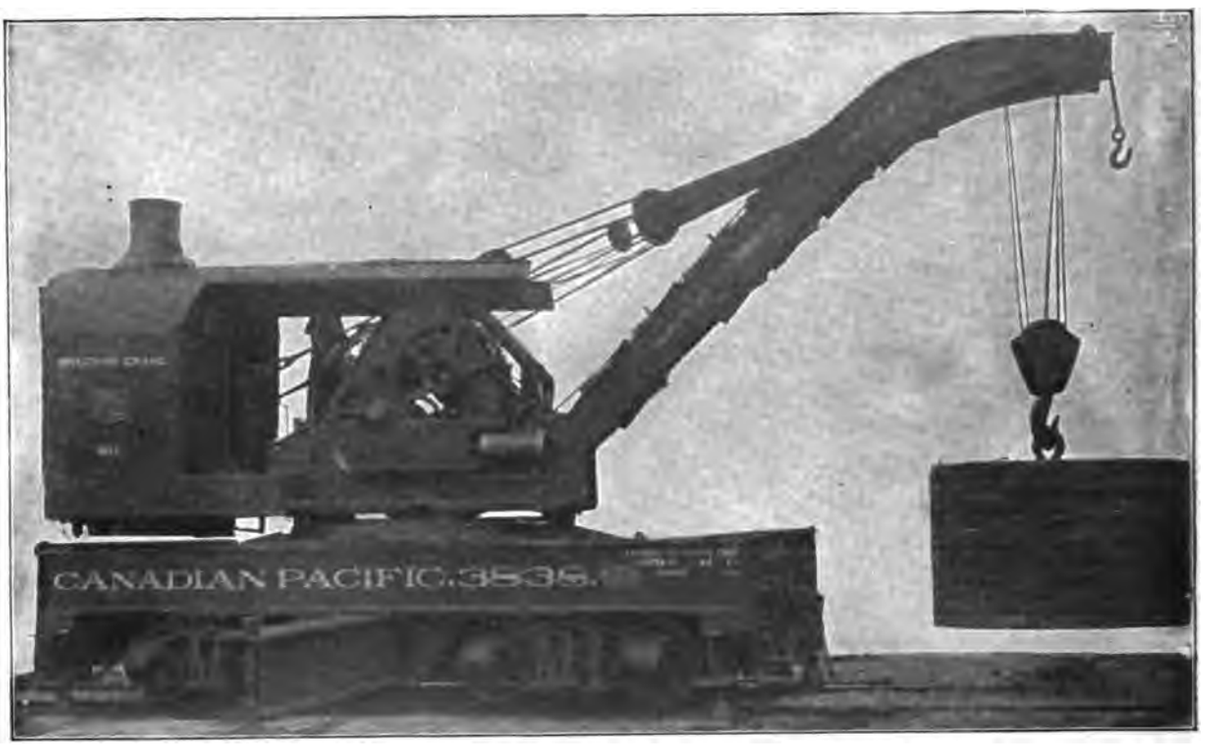


FIG. 142. STEAM WRECKING CRANE. CAPACITY, 100,000 LBS.
INDUSTRIAL WORKS, BUILDERS.

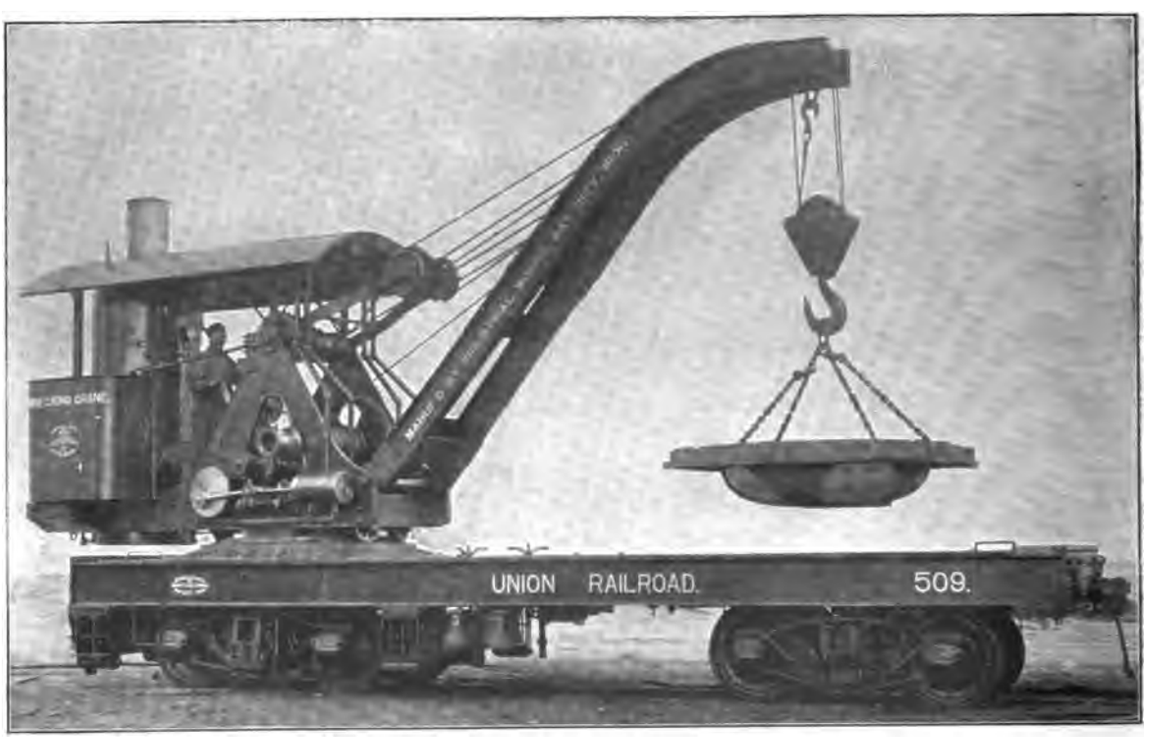


FIG. 143. STEAM WRECKING CRANE. UNION RAILROAD, CAPACITY, 20 TONS.
INDUSTRIAL WORKS, BUILDERS.

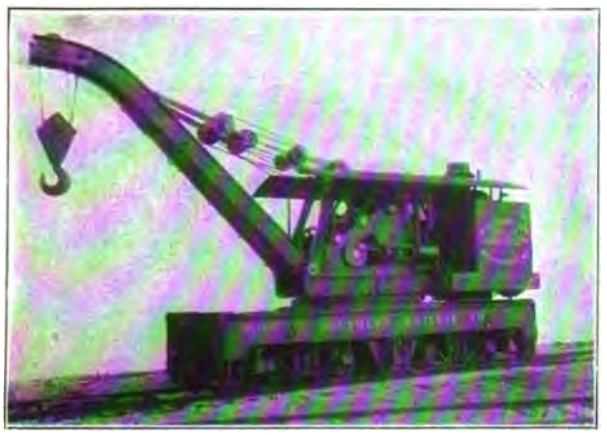


FIG. 144. STEAM WRECKING CRANE.
BUCYRUS CO., BUILDERS.

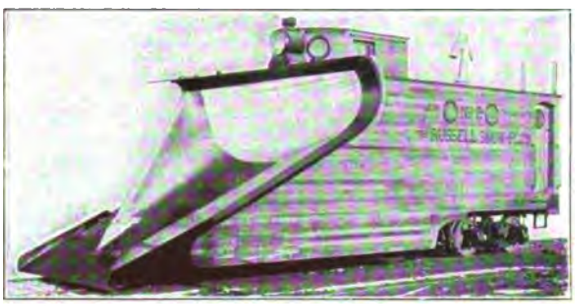


FIG. 145. RUSSELL SINGLE TRACK SNOW PLOW.

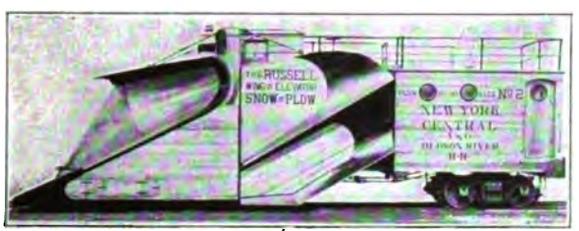


FIG. 146. RUSSELL WING ELEVATOR SNOW PLOW.

FIG. 147. RUSSELL DOUBLE TRACK SNOW PLOW.
THE RUSSELL CAR & SNOW PLOW CO., BUILDERS.

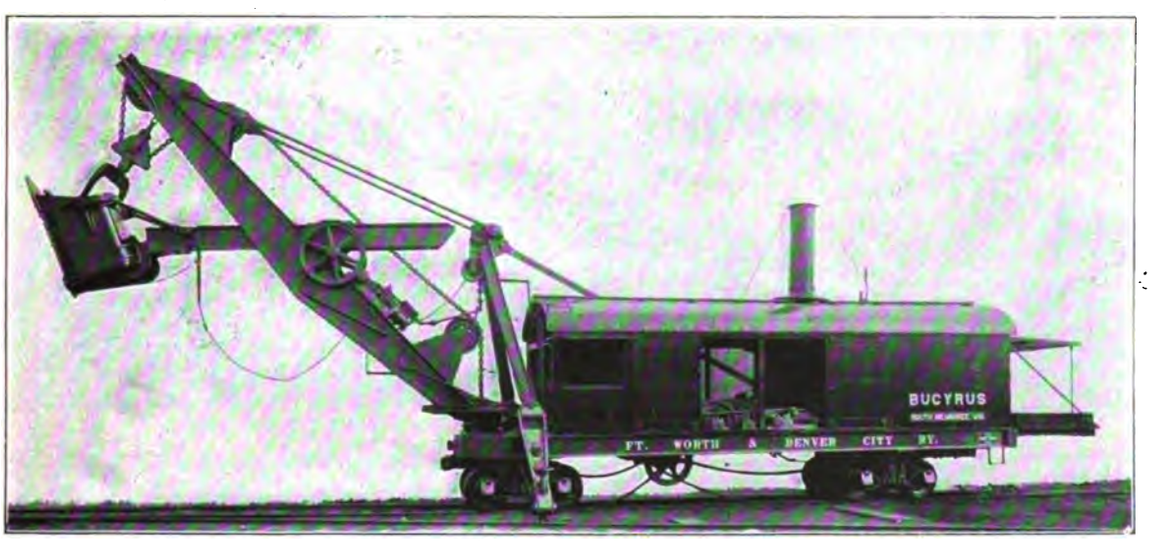
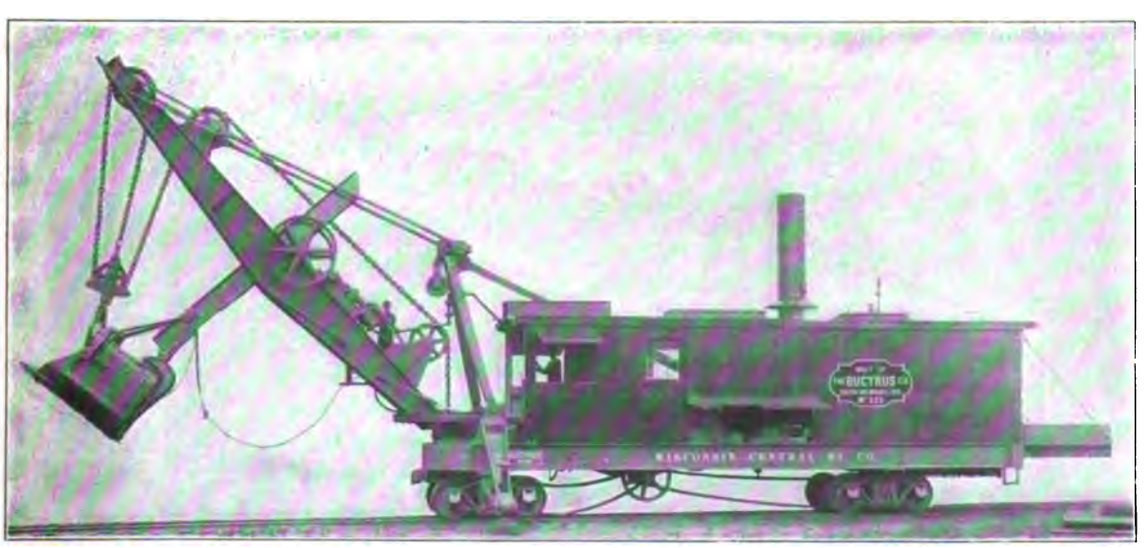


FIG. 148. 65-TON STEAM SHOVEL. FT. WORTH & DENVER CITY RY. BUCYRUS CO., BUILDERS.



(33) FIG. 149. 95-TON STEAM SHOVEL. WISCONSIN CENTRAL RY. BUCYRUS CO., BUILDERS.

FIG. 150. 65-TON GIANT STEAM SHOVEL. VULCAN IRON WORKS CO., BUILDERS.

FIG. 151. 45-TON GIANT STEAM SHOVEL. VULCAN IRON WORKS CO., BUILDERS.

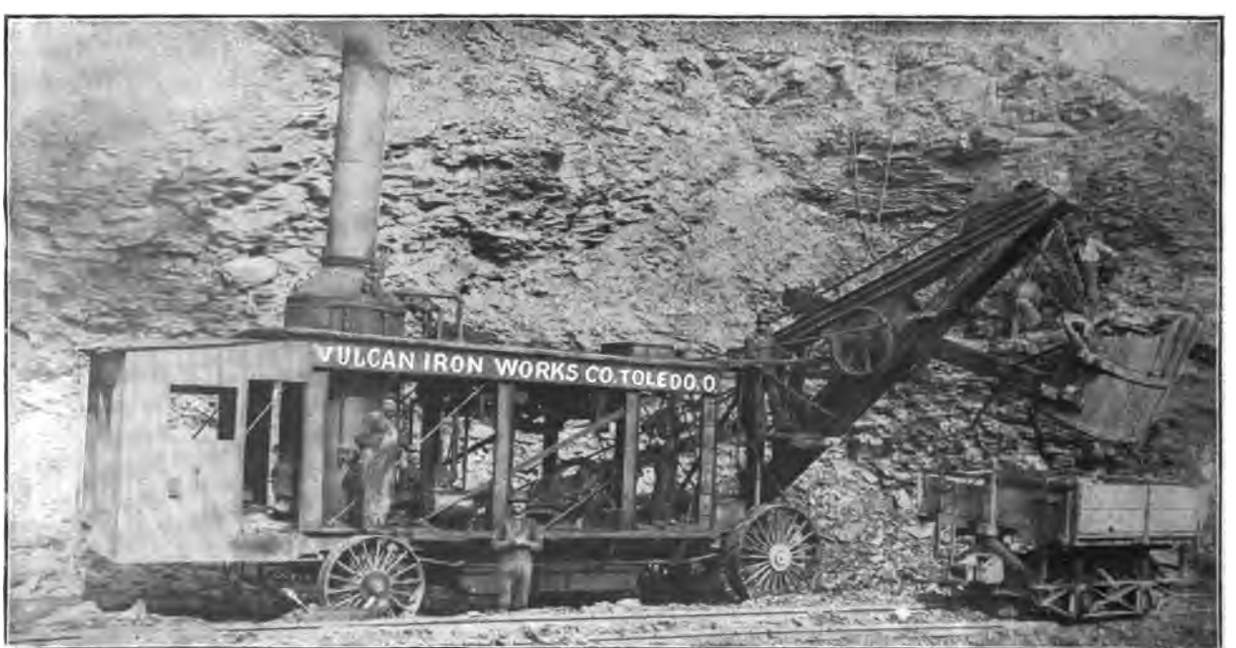


FIG. 152. 26-TON LITTLE GIANT TRACTION WHEEL STEAM SHOVEL.
VULCAN IRON WORKS CO., BUILDERS.

Fig. 153. No. 80, Steam Shovel, 3½ cu. yd. Bucket
Marion Steam Shovel Co., Builders.

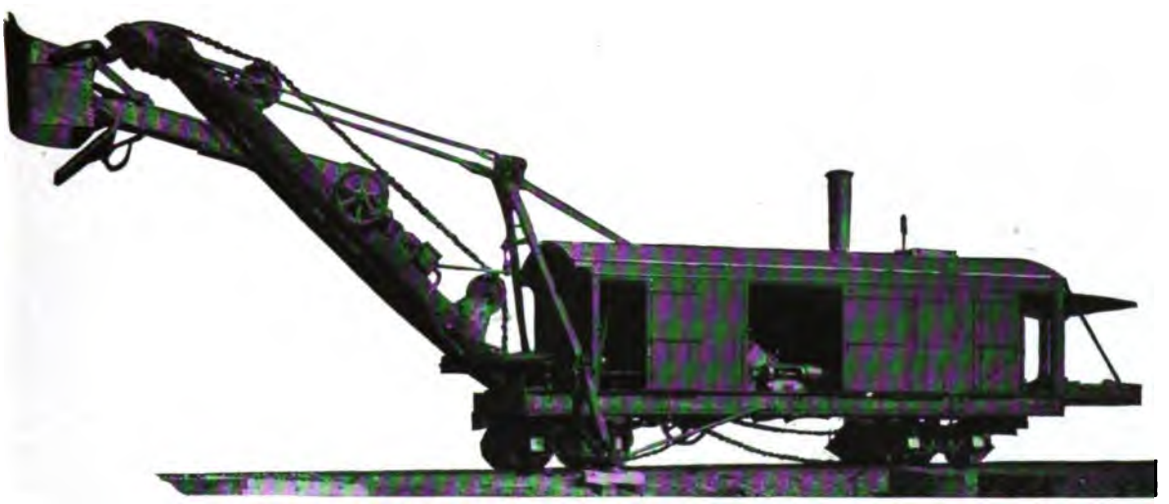


Fig. 154. No. 60, Steam Shovel, 2½ cu. yd. Bucket.
Marion Steam Shovel Co., Builders.

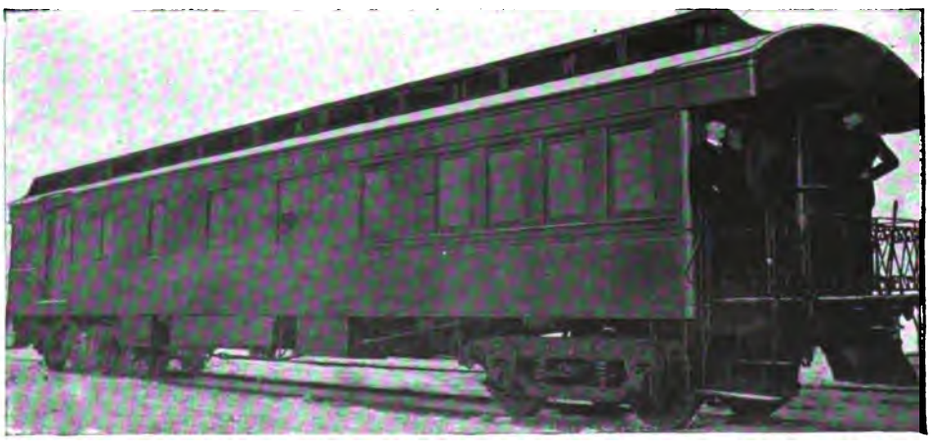


Fig. 155. Air Brake Instruction Car. Westinghouse Air Brake Co.

Fig. 156.

Fig. 157.

Interiors of Air Brake Instruction Car. Westinghouse Air Brake Co.

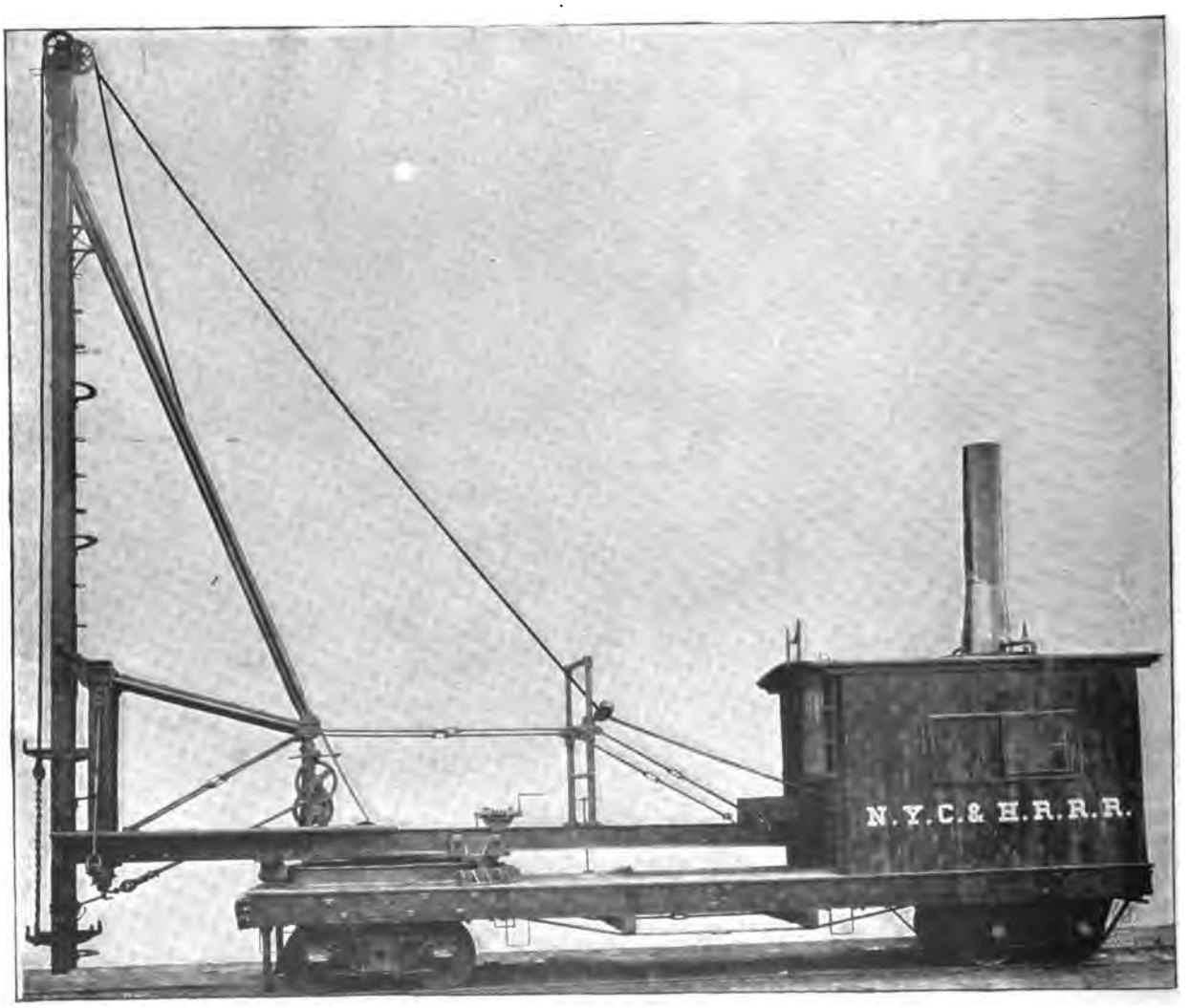
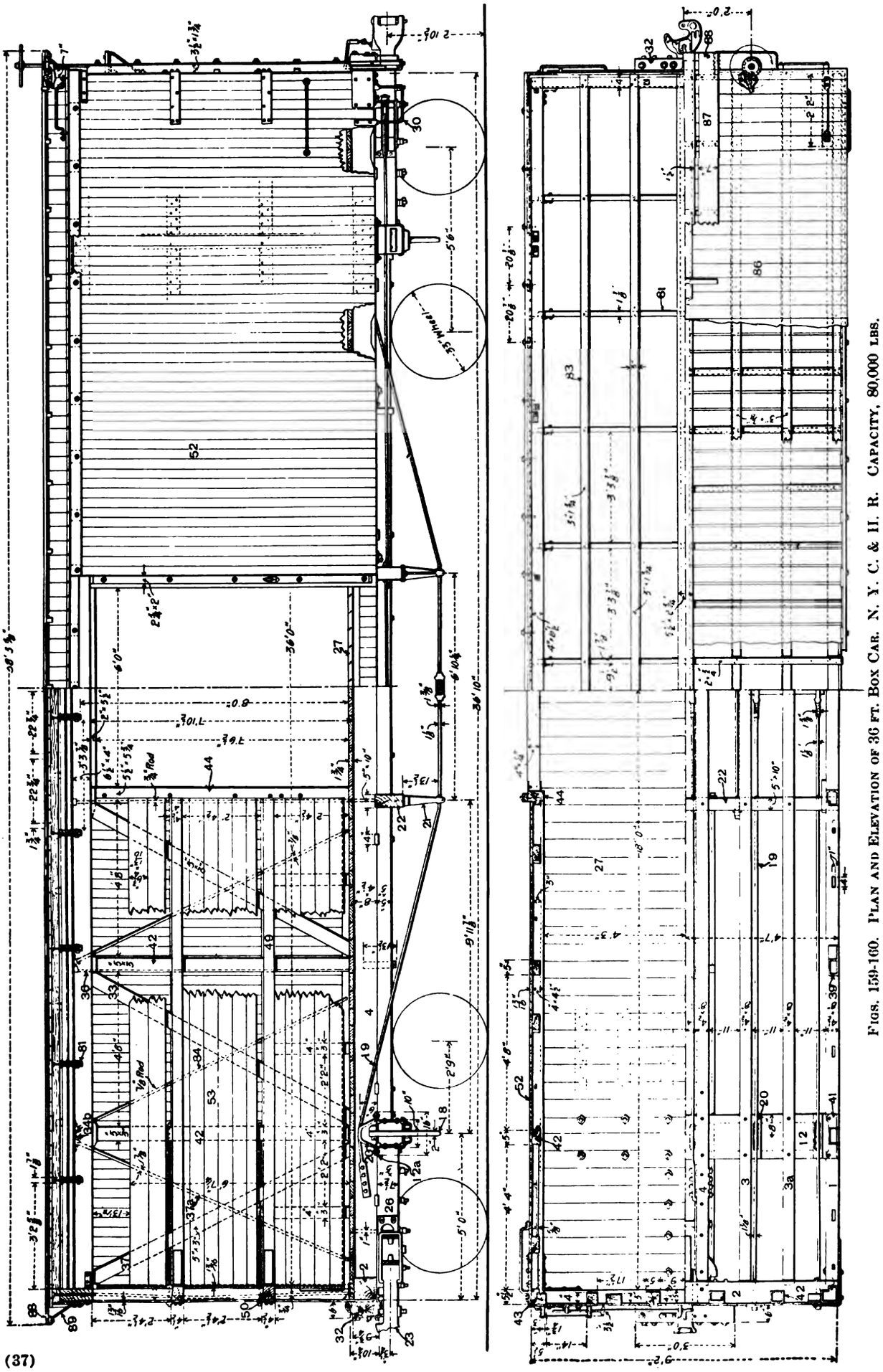


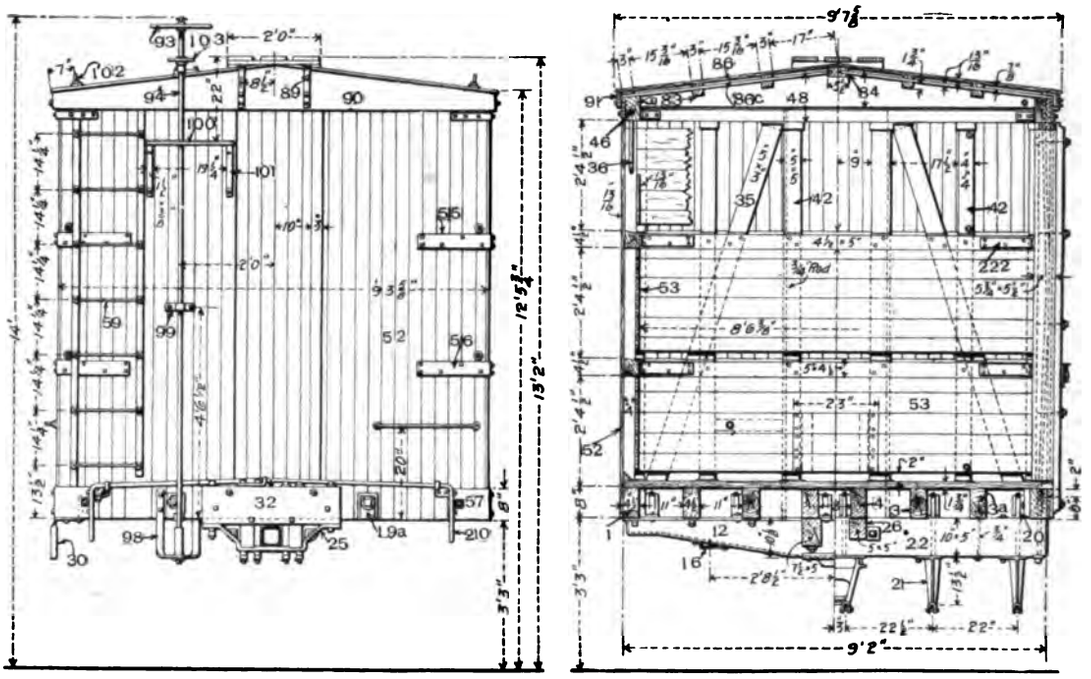
Fig. 158. Pile Driver Car. N. Y. C. & H. R.

Numbers Refer to List of Names with Figs. 168-69.



Figs. 159-160. Plan and Elevation of 36 ft. Box Car. N. Y. C. & H. R. Capacity, 80,000 lbs.

Numbers Refer to List of Names with Figs. 168-69.



Figs. 161-62. End Elevation and Section of 36-ft. Box Car, N. Y. C. & H. R. Capacity, 80,000 lbs.

Numbers Refer to List of Names with Figs. 168-69.

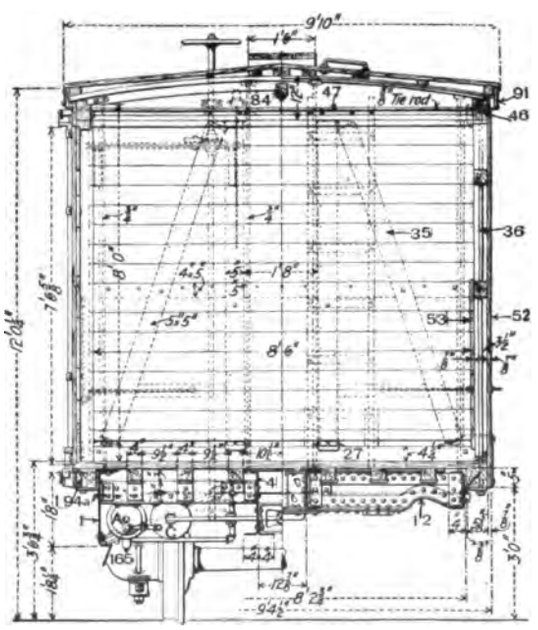
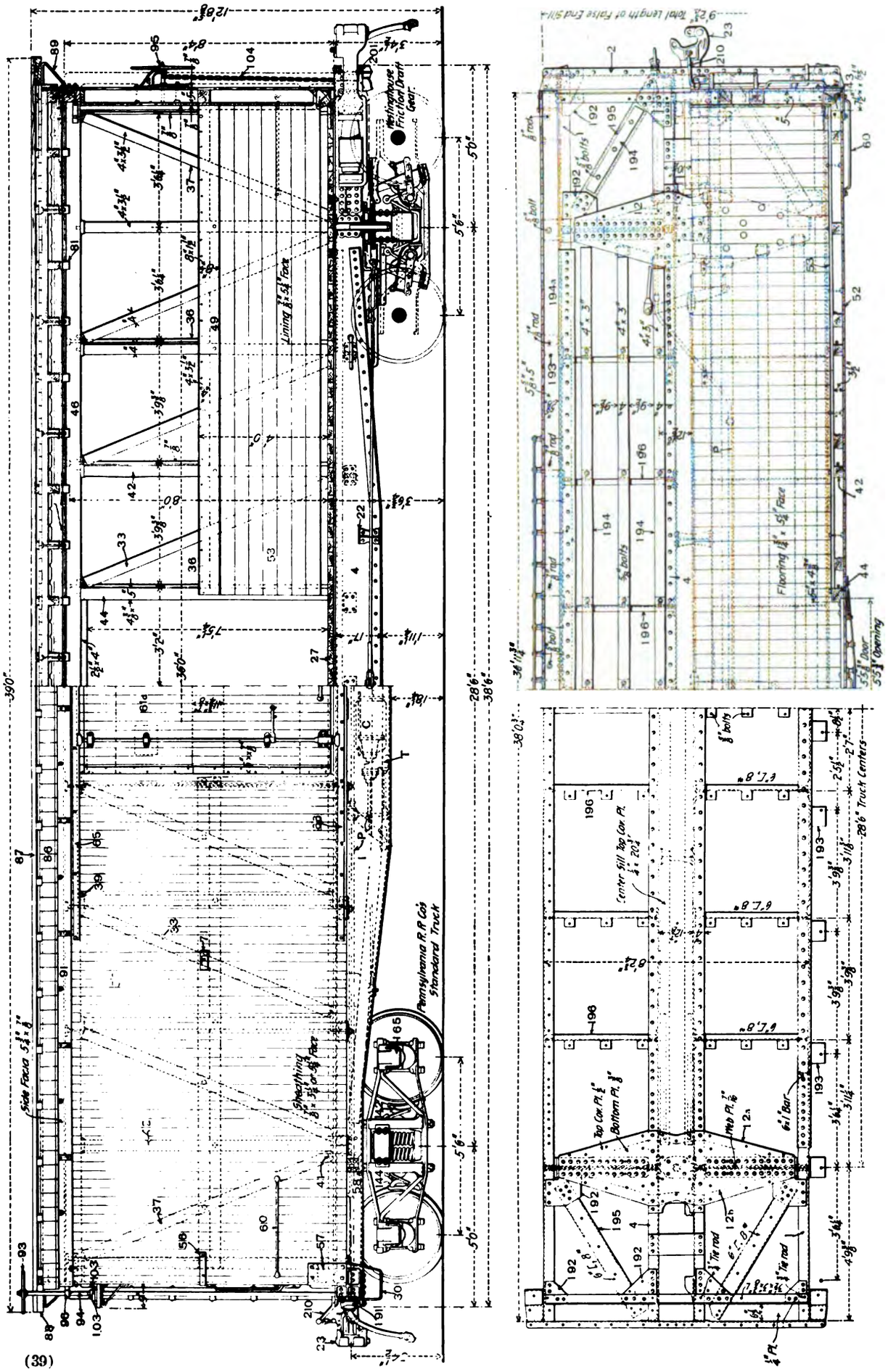


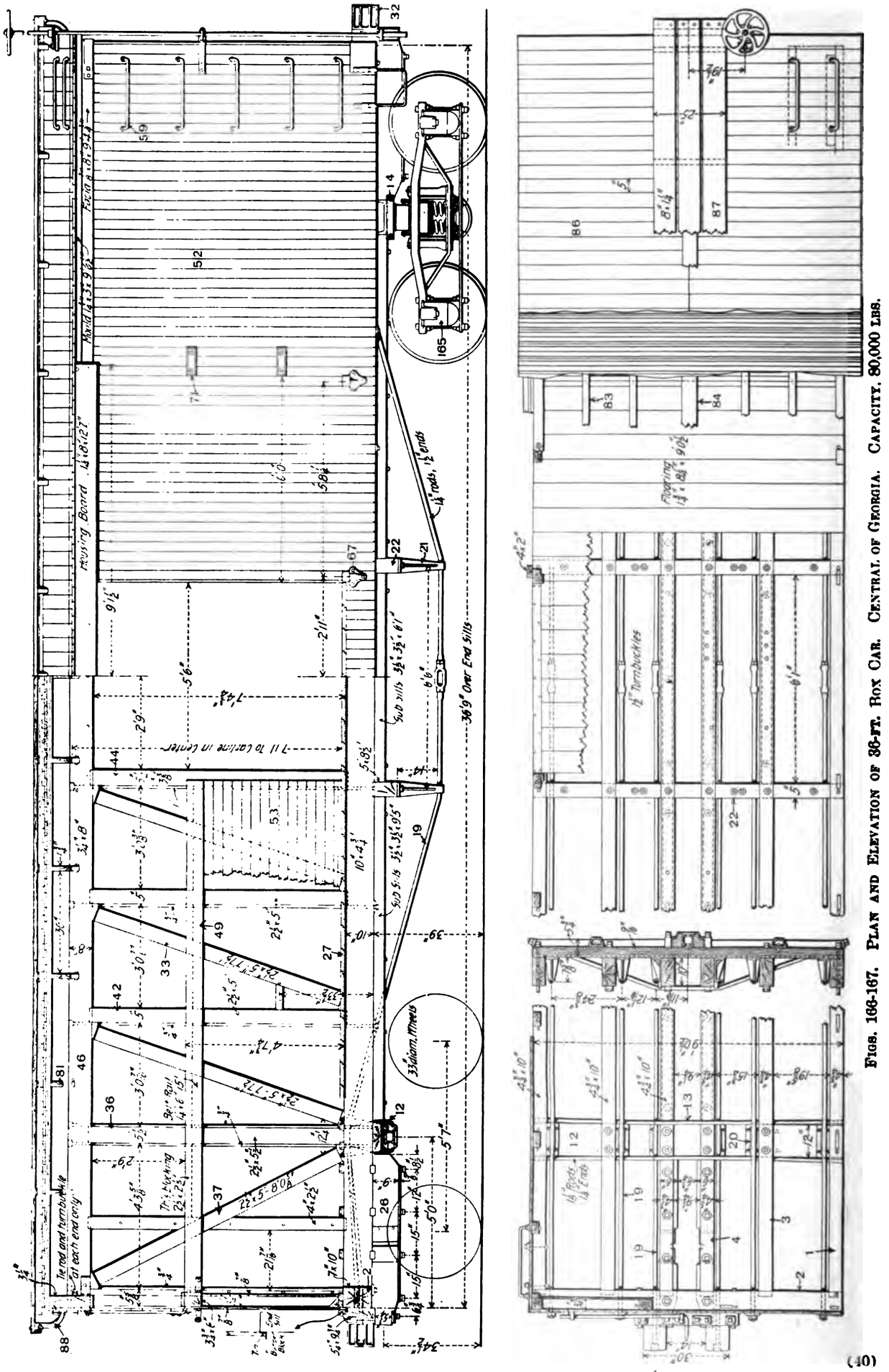
Fig. 163. Cross Section of 36 ft. Standard Box Car. P. R. R. Pressed Steel Underframe. Capacity, 100,000 lbs.

NUMBERS REFER TO LIST OF NAMES WITH FIGS. 168-69.



FIGS. 164-165. PLAN AND ELEVATION OF 36-FT. STANDARD BOX CAR, P. R. R. PRESSED STEEL UNDERFRAME. CAPACITY, 100,000 LBS.

NUMBERS REFER TO LIST OF NAMES WITH FIGS. 168-69.


Flooring 1¼" x 8½" x 9'0½"
Roofing 1¼" x 8½" x 9'0½"
14" Tombuckles
Sub sills 5½" x 12" x 41'0"
36'9" Over End Sills
7'11" to Coupler in Center
Steel Roof 14'6" Rise
Truss Rods 1¼" Ends
Metal 14'3" x 9'0½"
Wood 14'5" x 9'0½"
Running Board 14'6" x 2'2"
Hand Holds
Ladder
Brake Staff
Brake Wheel
Sill Steps
Grab Irons
Side Stakes
Door Stops
Door Guides
Door Hangers
Door Rollers
Door Tracks
Door Fasteners
Door Locks
Door Bolts
Door Handles
Door Latches
Door Pulls
Door Springs
Door Hinges
Door Pins
Door Rods
Door Chains
Door Cables
Door Pulleys
Door Weights
Door Counterweights
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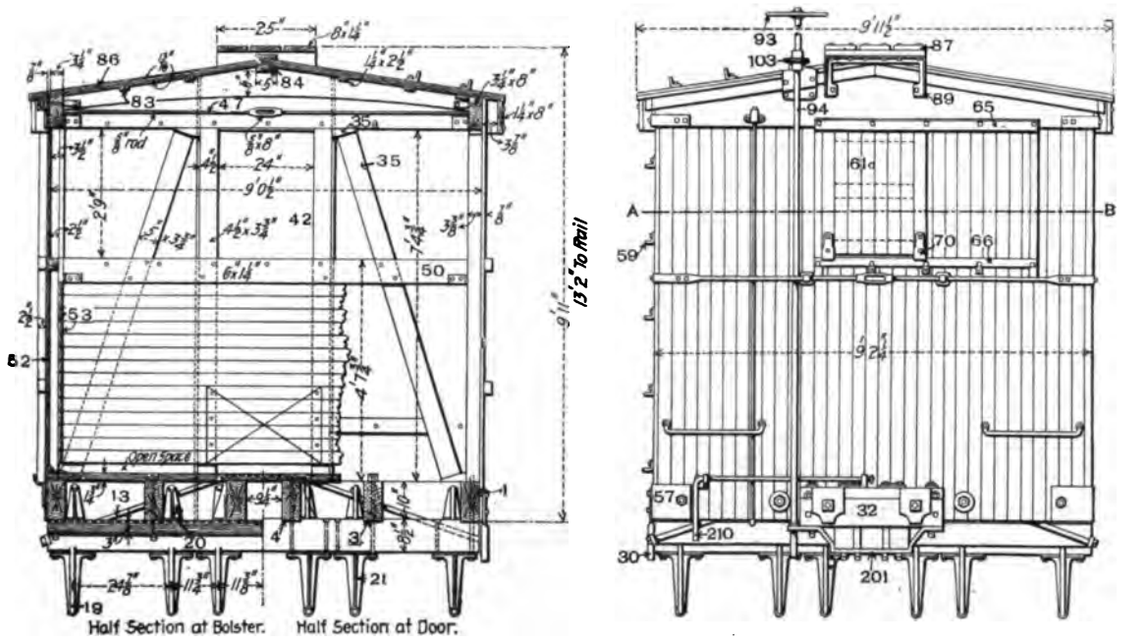
Door Counterbalance

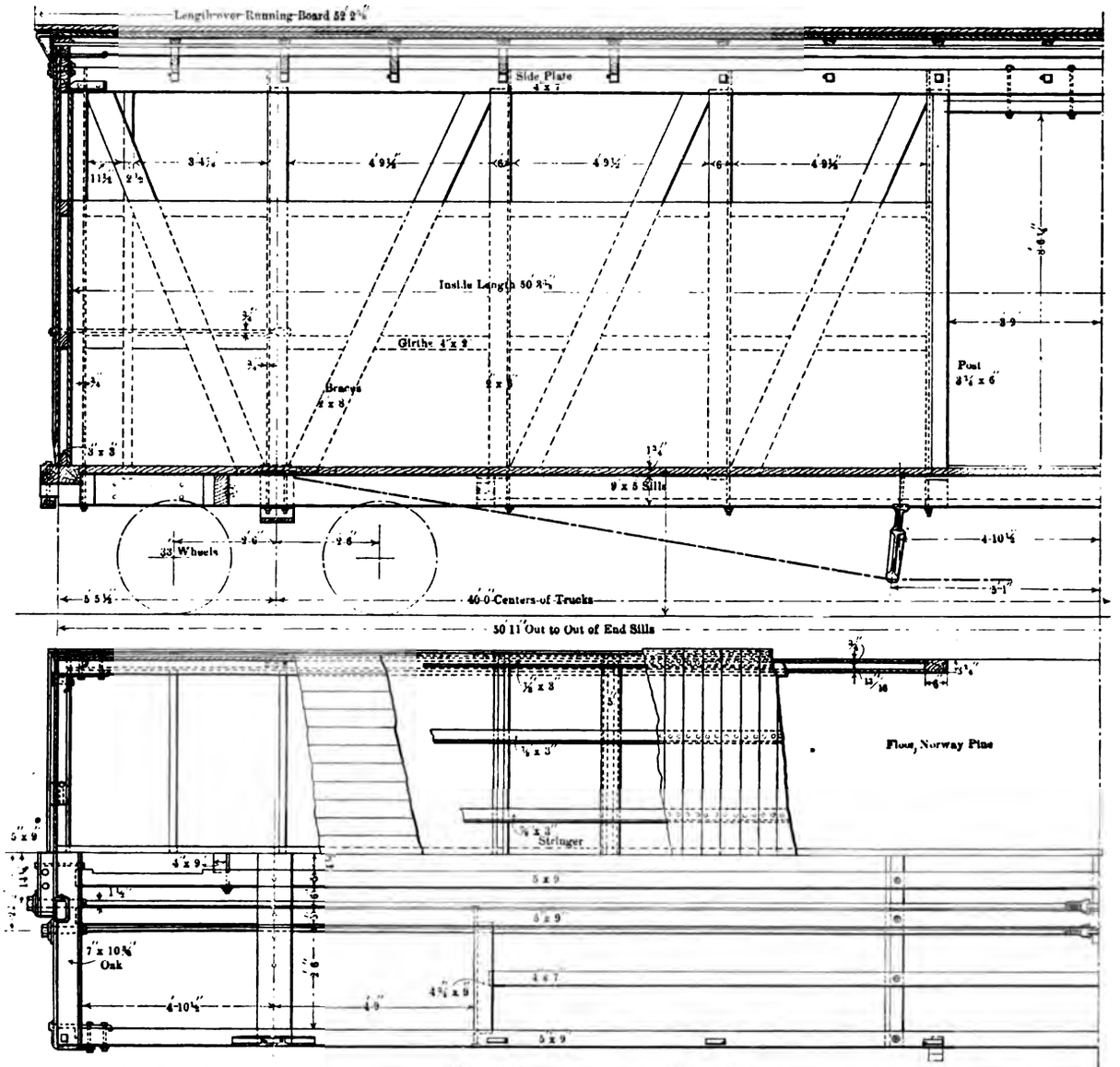
Numbers Refer to List of Names Below.



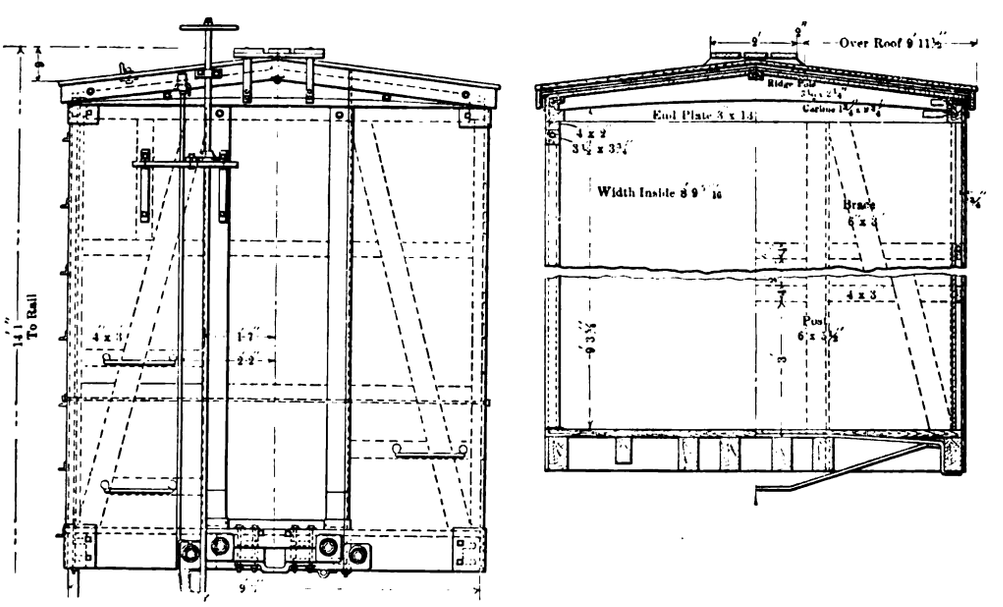
Figs. 168-69. End Elevation and Sections of 36-ft. Box Car, Central of Georgia. Capacity, 80,000 lbs.

List of Names of Parts of Box-Car Bodies. Figs. 159-169.

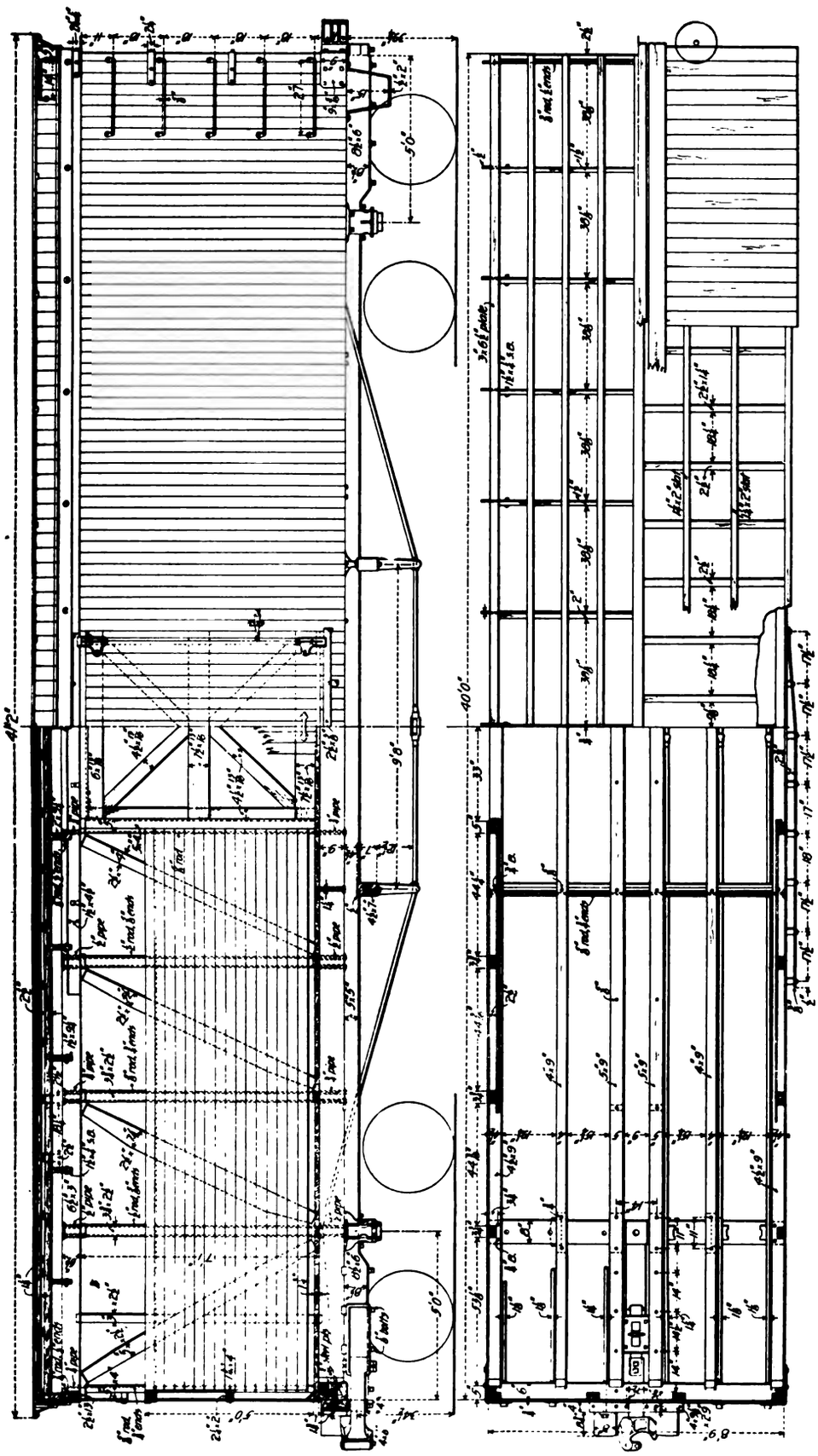
1. *Side Sill*
2. *End Sill*
3. *Inner Intermediate Sill*
3a. *Outer Intermediate Sill*
4. *Center Sill*
12. *Body Bolster*
12a. *Top Plate of Metal Body Bolster*
12b. *Bottom Plate of Metal Body Bolster*
16. *Body Side Bearing*
17. *Body Center Plate*
18. *King Bolt or Center Pin*
19. *Body Truss Rod*
19a. *Body Truss Rod Washer*
20. *Body Truss Rod Saddle*
21. *Body Truss Rod Bearing*
22. *Cross Tie Timber or Needlebeam*
23. *Drawbar*
24. *Draft Spring*
25. *Carry Iron*
26. *Draft Timber*
27. *Floor*
30. *Sill Step*
32. *Buffer Block*
32a. *Buffer Beam*
33. *Brace*
34. *Brace Rod*
34a. *End Brace Rod*
34b. *Double Counterbrace Rod Plate Washer*
34c. *Counterbrace Rod Plate Washer*
35. *End Brace*
35a. *End Brace Pocket*
36. *Sill and Plate Rod*
37. *Counterbrace*
37a. *Counterbrace Rod*
38. *Brace Rod Washer*
39. *Brace Pocket*
41. *Double Brace Pocket*
42. *Post*
42a. *Post Pocket*
43. *Corner Post*
44. *Door Post*
44a. *Door Post Pocket*
45. *Corner Post Pocket*
46. *Plate*
47. *Plate Rod*
48. *End Plate*
49. *Belt Rail*
50. *End Belt Rail*
51. *End Belt Rail Tie Rod*
52. *Sheathing or Siding*
53. *Inside Lining*
54. *Lining Strip*
55. *Upper Corner Plate*
56. *Middle Corner Plate*
57. *Lower Corner Plate*
58. *Roping Staple*
59. *Ladder Round*
60. *Hand Hold*
61. *Grated Door*
61d. *Door*
64. *Door Sill*
65. *Top Door Track*
66. *Bottom Door Track*
67. *Door Track Bracket*
68. *Door Hanger*
69. *Door Brace*
70. *Door Shoe*
71. *Open Door Stop*
72. *Closed Door Stop*
73. *Door Hasp*
74. *Door Pin*
75. *Door Pin Chain*
78. *Door Handle*
81. *Carline*
83. *Purlin*
84. *Ridge Pole*
86. *Roof Boards*
86c. *Inside Roof*
87. *Running Board*
88. *Running Board Extension*
89. *Running Board Bracket*
90. *End Fascia Board*
91. *Fascia Board*
93. *Brake Hand Wheel*
94. *Brake Shaft*
95. *Horizontal Brake Shaft*
96. *Upper Brake Shaft Bearing*
97. *Lower Brake Shaft Bearing*
98. *Brake Shaft Step*
99. *Brake Shaft Bracket*
100. *Brake Step*
101. *Brake Step Bracket*
102. *Hand Hold*
103. *Brake Ratchet Wheel*
103'. *Brake Pawl*
104. *Horizontal Brake Shaft Chain*
105. *Brake Shaft Chain Sheave*
142. *Brake Head*
143. *Brake Beam*
144. *Brake Hanger*
145. *Brake Lever*
146. *Brake Lever Fulcrum*
147. *Brake Lever Guide*
148. *Brake Lever Bracket*
150. *Brake Chain*
151. *Brake Shaft Connecting Rod*
152. *Brake Lever Connecting Rod*
165. *Journal Box*
177. *Door Cap*
186. *Key Blocks*
188. *Brake Hanger Bolt*
190. *Brake Hand Rail*
191. *Push Pole Corner Iron*
192. *Gusset Plates*
194. *Nailing Strip*
193. *Side Nailing Strip Brackets*
194a. *Side Nailing Strip*
195. *End Sill Diagonal Brace*
196. *Nailing Strip Cross Ties*
201. *Drawbar Carry Iron*
210. *Uncoupling Lever and Rod*
220. *Sill Strap Bolt*
222. *Inside Upper Corner Plate*
A = *Auxiliary Air Reservoir*
C = *Brake Cylinder*
P = *Train Pipe*
T = *Triple Valve*



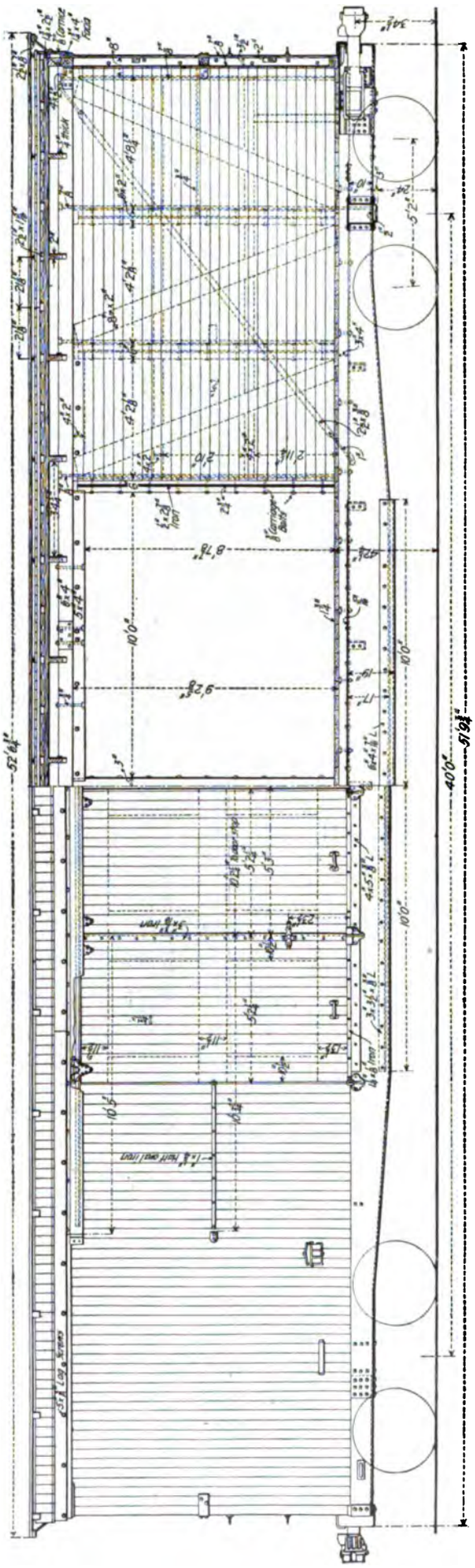
FIGS. 170-71. PLAN AND ELEVATION OF 50-FT. FURNITURE CAR WITH 7 FT. 6 IN. SIDE DOORS. C., B. & Q. CAPACITY, 50,000 LBS.

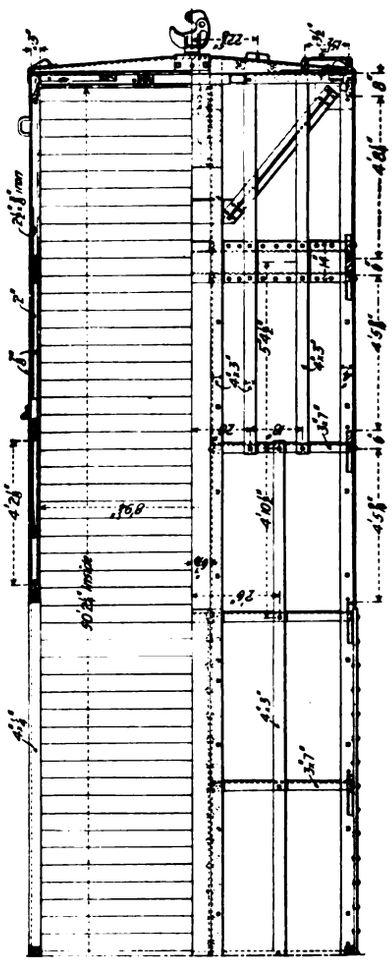


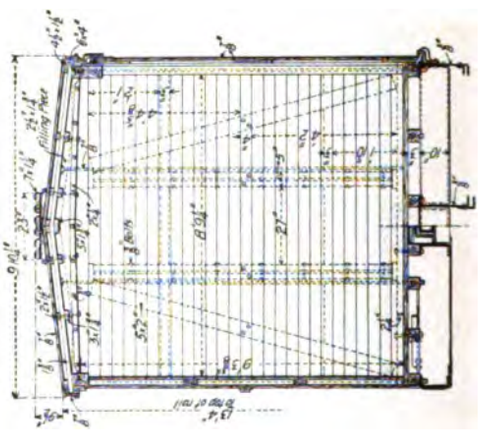
FIGS. 172-73. END ELEVATION AND SECTION OF 50 FT. FURNITURE CAR WITH 7 FT. 6 IN. SIDE DOORS. C., B. & Q. CAPACITY, 50,000 LBS.

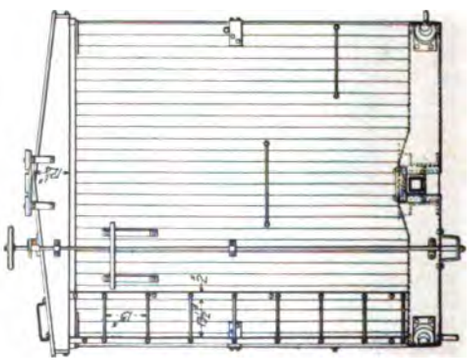


FIGS. 174-175. PLAN AND ELEVATION OF CANDA BOX CAR. LENGTH, 40 FT. CAPACITY, 100,000 LBS.









FIGS. 176-79. PLAN, ELEVATIONS AND SECTIONS OF 50 FT. FURNITURE CAR. ERIE R. R. PRESSED STEEL UNDERFRAME. CAPACITY, 60,000 LBS.

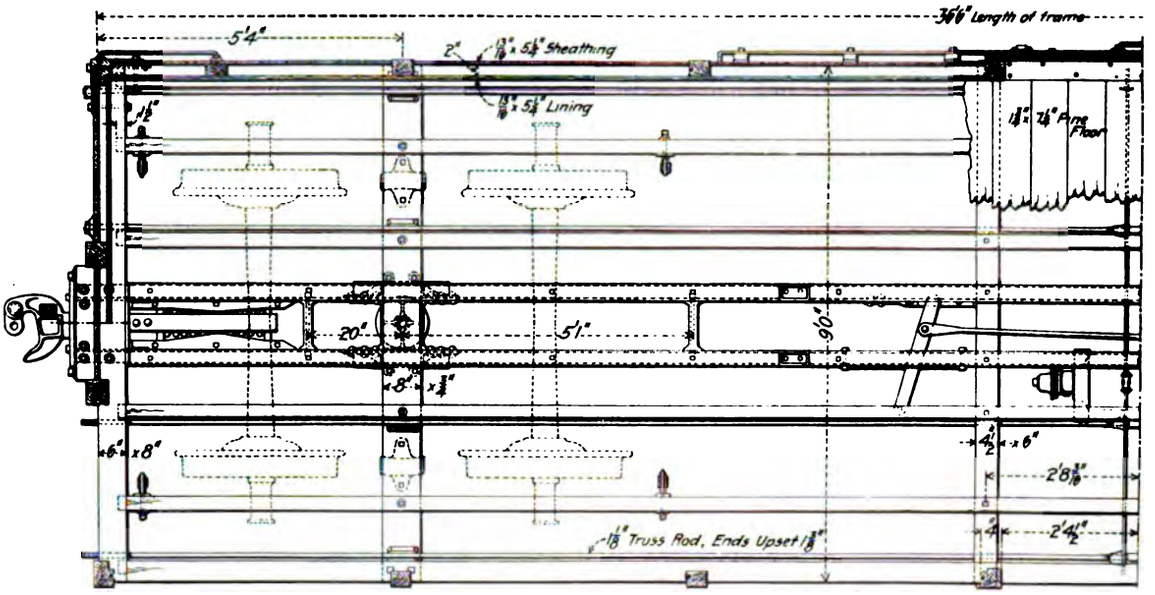


FIG. 180. HALF PLAN OF 36 FT. BOX CAR, STEEL CHANNEL CENTER SILLS. C., M. & ST. P. CAPACITY, 60,000 LBS.

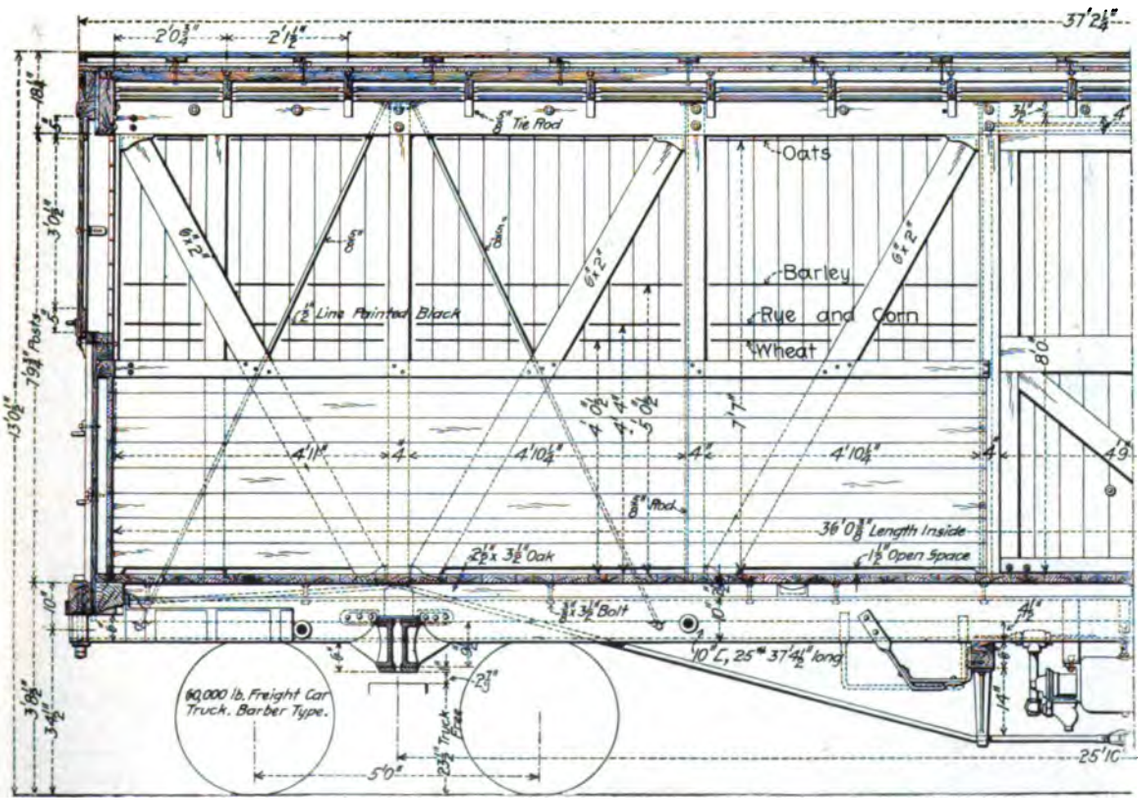


FIG. 181. HALF LONGITUDINAL SECTION OF 36 FT. BOX CAR, STEEL CHANNEL CENTER SILLS. C., M. & ST. P. CAPACITY, 60,000 LBS.

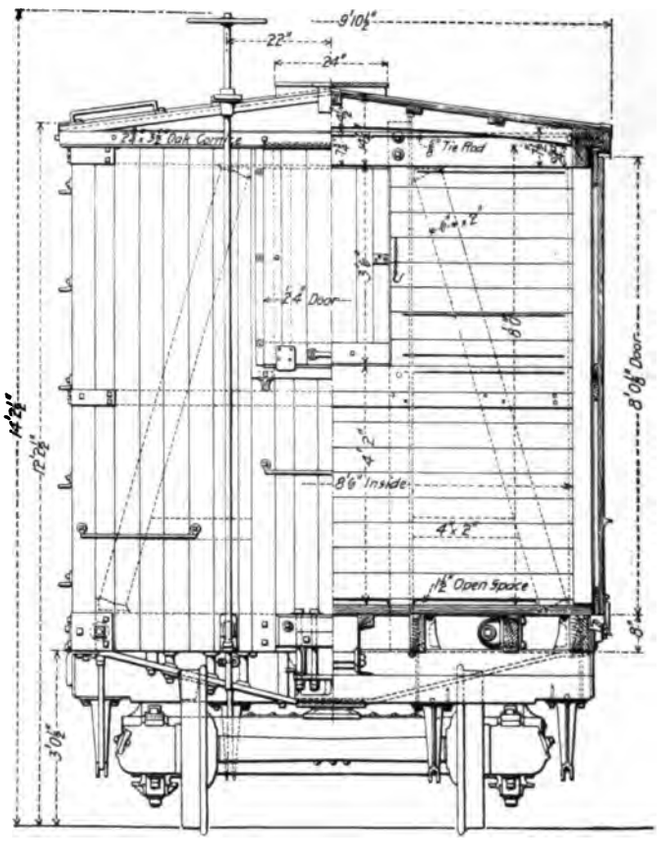
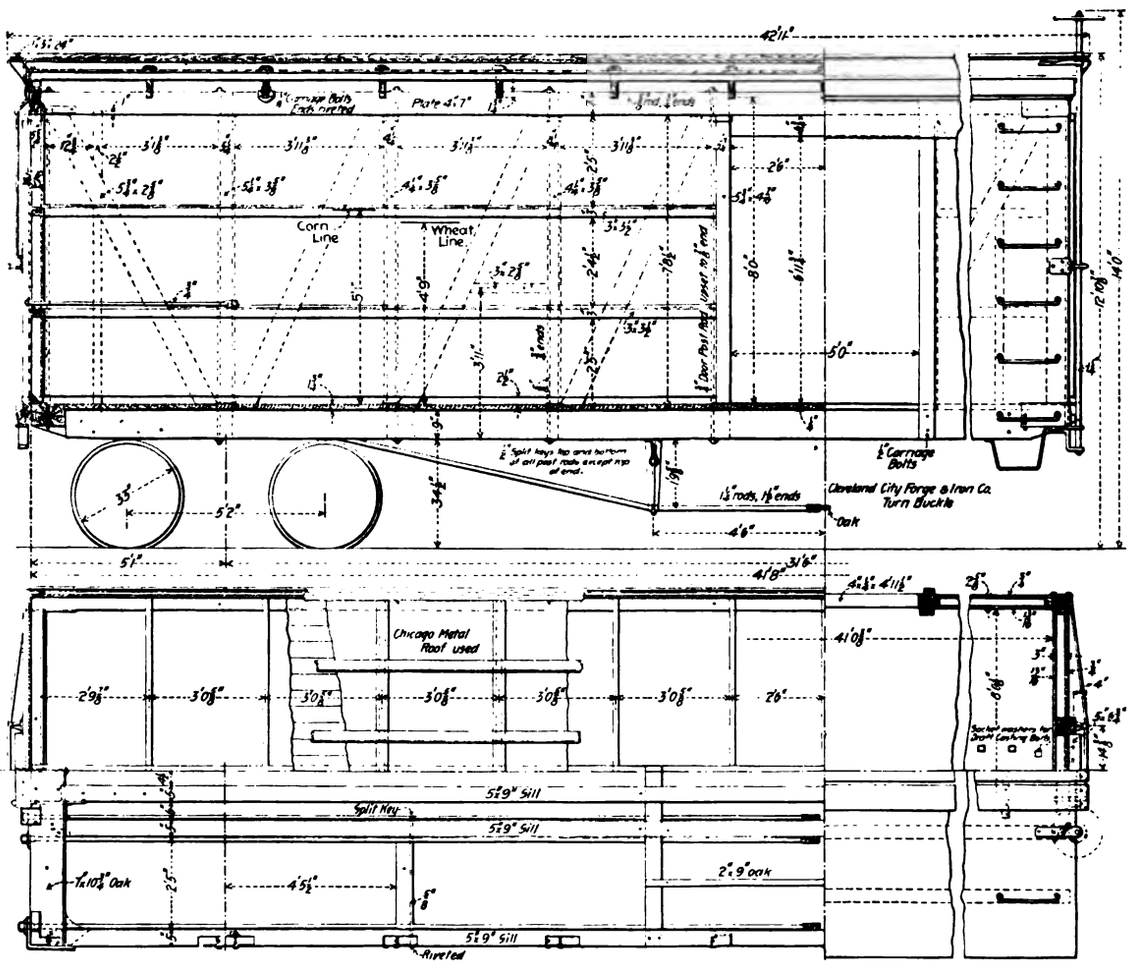
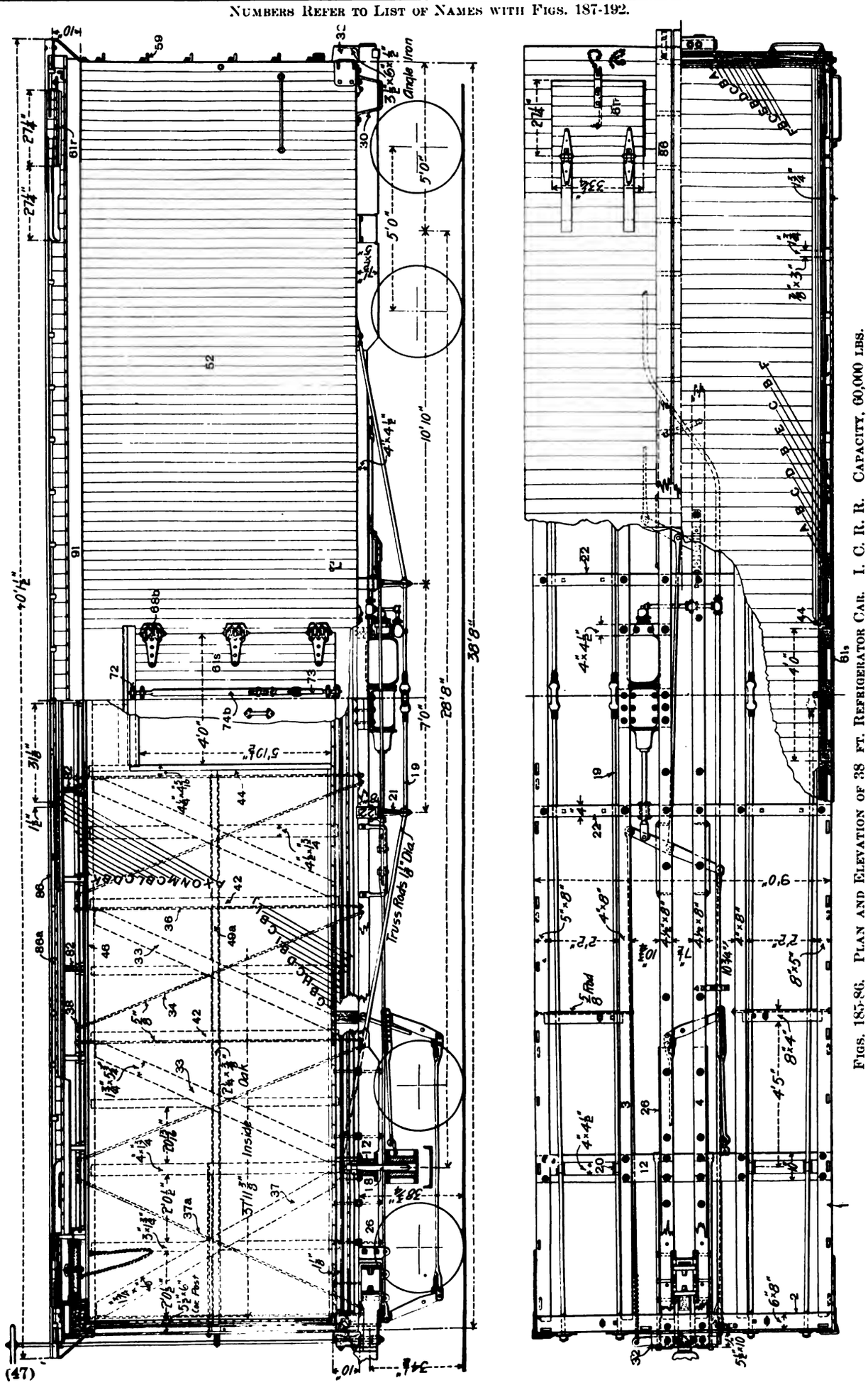


FIG. 182. HALF END ELEVATION AND CROSS SECTION OF 36 FT. BOX CAR, STEEL CHANNEL CENTER SILLS. C., M. & ST. P. CAPACITY, 60,000 LBS.



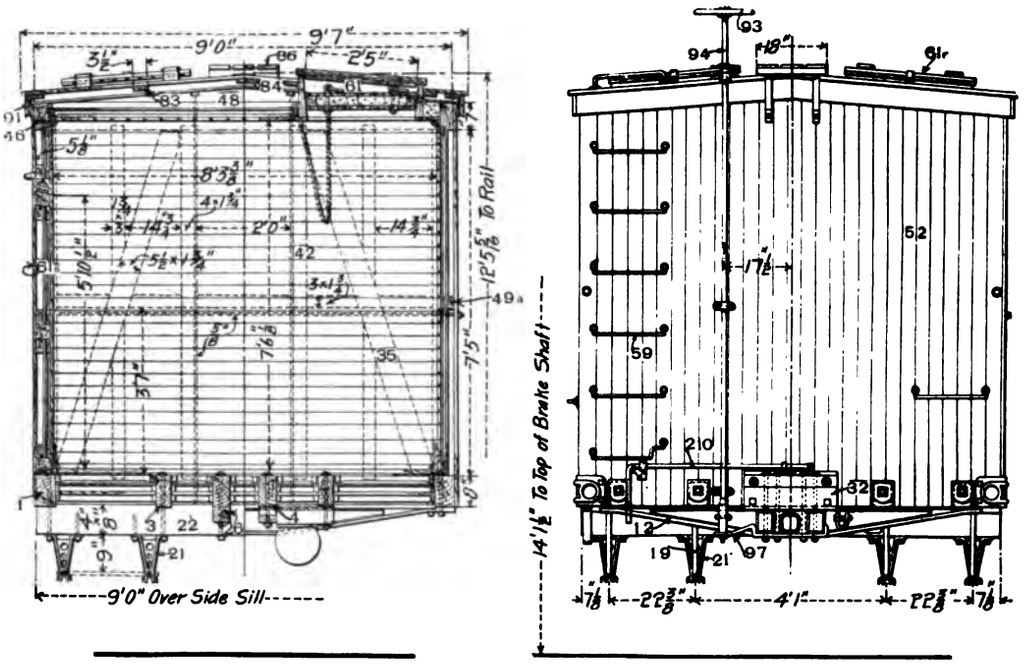
FIGS. 183-84. PLAN AND ELEVATION OF 41 FT. BOX CAR. C., B. & Q. CAPACITY, 80,000 LBS.

NUMBERS REFER TO LIST OF NAMES WITH FIGS. 187-192.

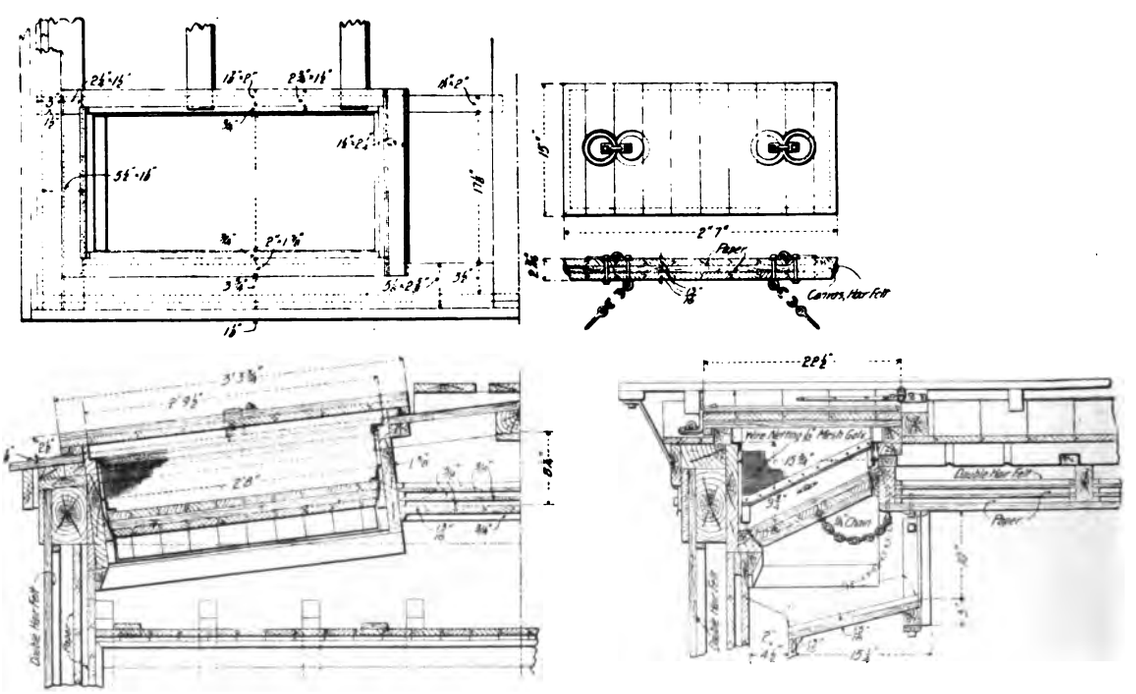


FIGS. 185-86. PLAN AND ELEVATION OF 38 FT. REFRIGERATOR CAR. I. C. R. R. CAPACITY, 60,000 LBS.

Numbers Refer to List of Names on Opposite Page.



Figs. 187-88. End Elevation and Cross Section of 38 ft. Refrigerator Car. I. C. R. R. Capacity, 60,000 lbs.



Figs. 189-92. Details of End Ventilators. 35 ft. Produce Car. N. Y. C. & H. R. Capacity, 60,000 lbs.

NUMBERS REFER TO LIST OF NAMES BELOW.

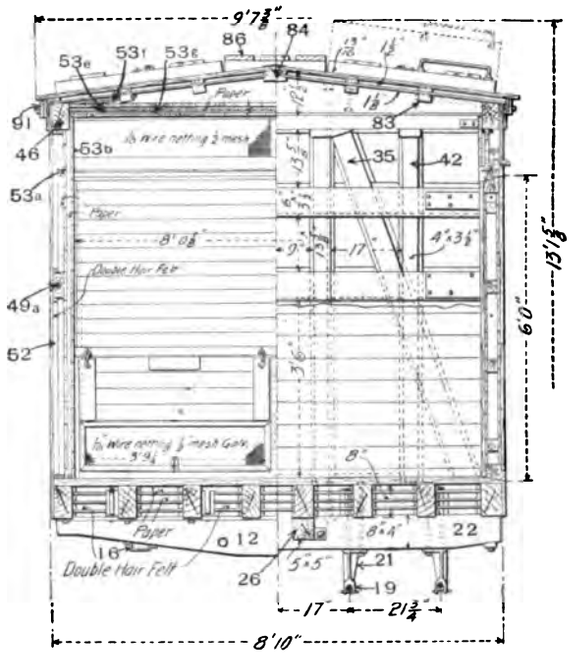
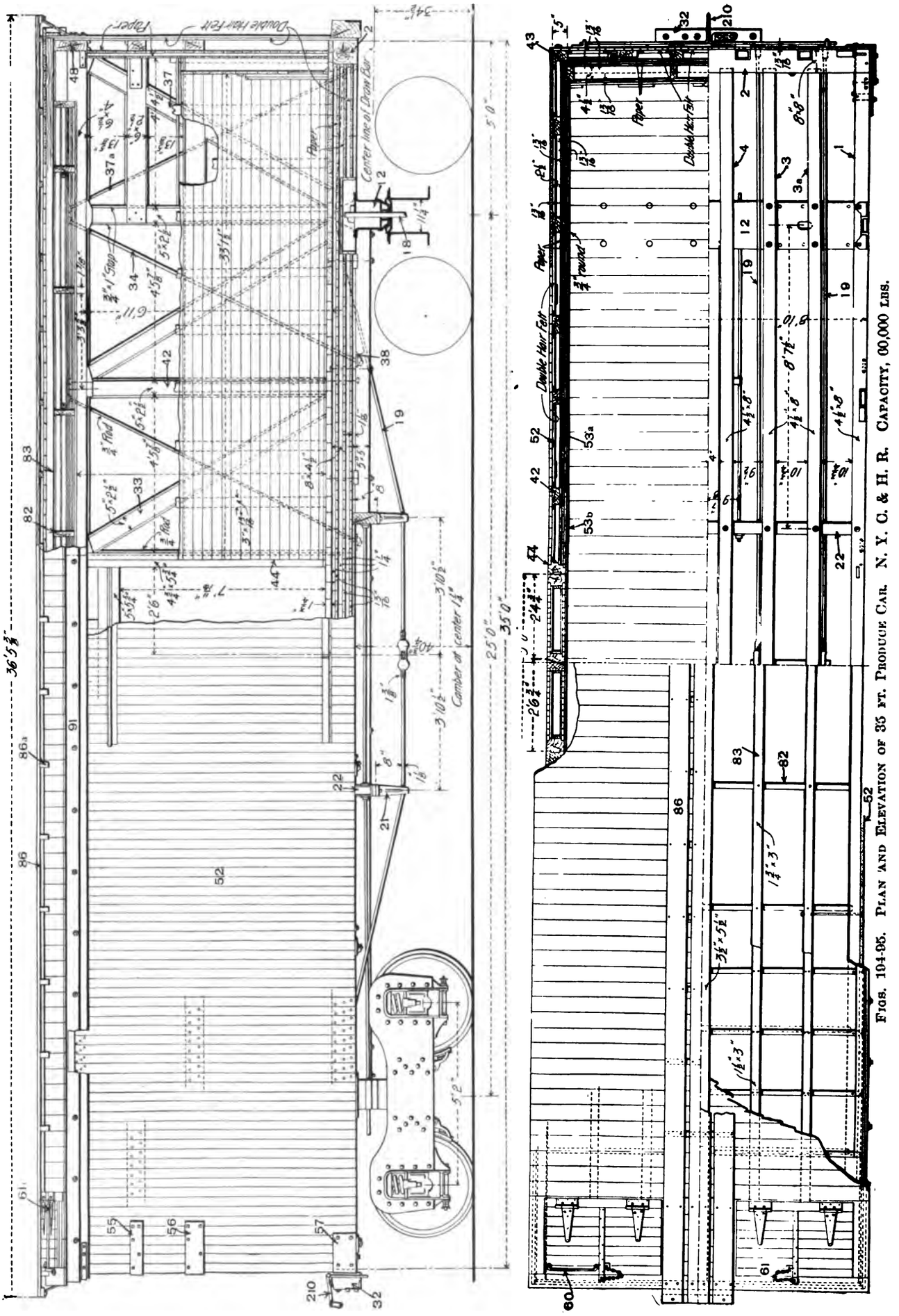


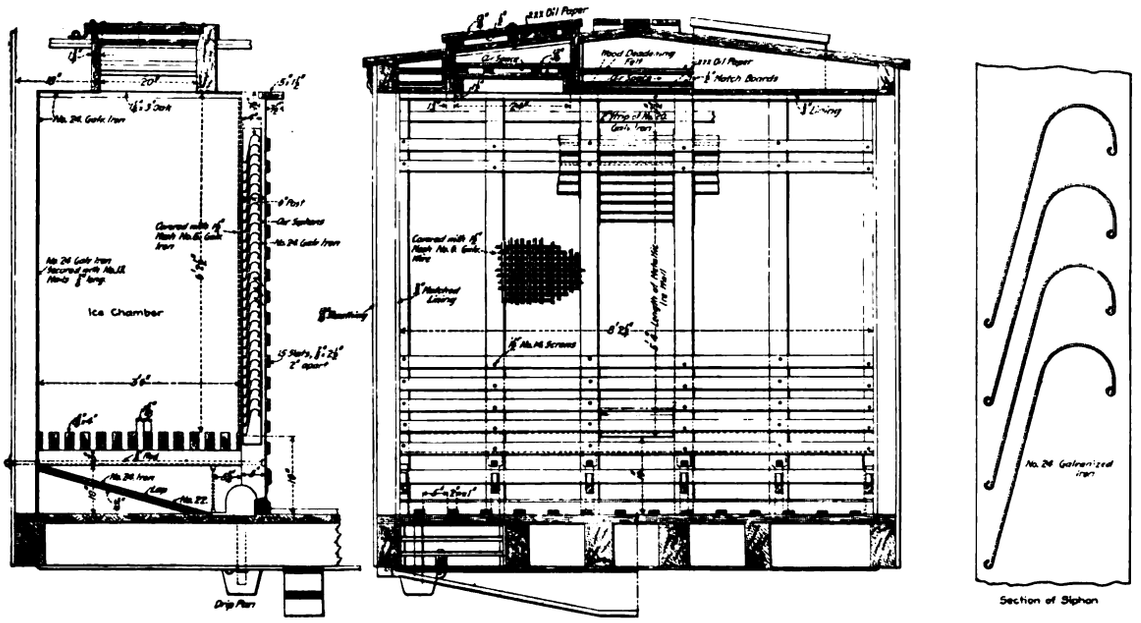
FIG. 193. CROSS SECTIONS, 35-FT. PRODUCE CAR. N. Y. C. & H. R. CAPACITY, 60,000 LBS.

NAMES OF PARTS OF REFRIGERATOR CARS. FIGS. 185-195.

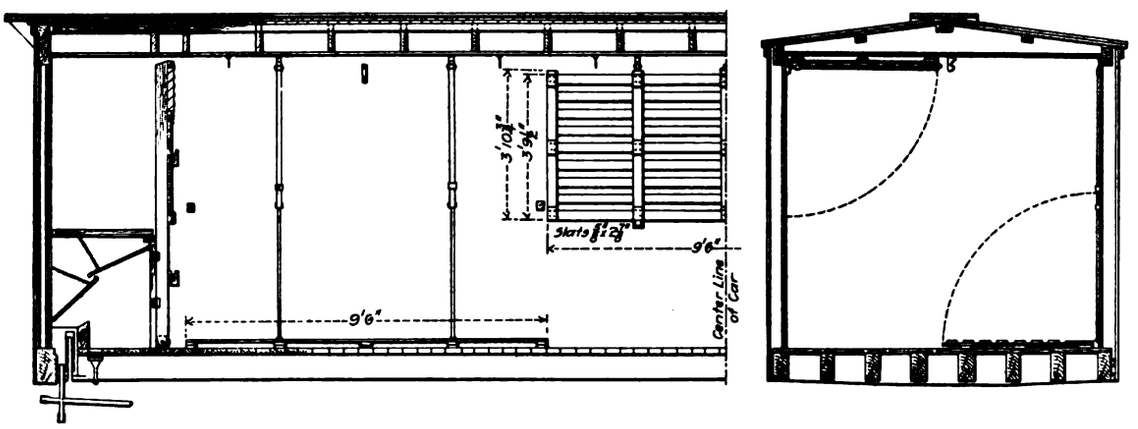
1. *Side Sill*
2. *End Sill*
3. *Inner Intermediate Sill*
3a. *Outer Intermediate Sill*
4. *Center Sill*
12. *Body Bolster*
16. *Body Side Bearing*
18. *King Bolt*
19. *Body Truss Rod*
20. *Body Truss Rod Saddle*
21. *Body Truss Rod Bearing*
22. *Cross Tie Timber or Needlebeam*
26. *Draft Timber*
30. *Sill Step*
32. *Buffer Beam*
33. *Brace*
34. *Brace Rod*
34a. *End Brace Rod*
35. *End Brace*
37. *Counterbrace*
37a. *Counterbrace Rod*
42. *Post*
38. *Brace Rod Washer*
43. *Corner Post*
44. *Door Post*
46. *Plate*
48. *End Plate*
49a. *Side Belt Rail*
49b. *End Belt Rail*
49c. *End Belt Rail*
52. *Sheathing*
53b. *Inside Lining*
53a. *Intermediate Lining*
53e. *Inner Overhead Lining*
53f. *Outer Overhead Lining*
53g. *Intermediate Overhead Lining*
54. *Lining Stud*
55. *Upper Corner Plate*
57. *Lower Corner Plate*
59. *Ladder Round*
60. *Hand Holds*
61e. *End Door*
61r. *Roof Door for Ice*
61s. *Door*
68b. *Door Hinge*
72. *Door Bolt Bracket*
73. *Door Hasp*
74b. *Door Bolt or Bar*
76. *Door Pin Chain*
77. *Door Stop*
82. *Carline*
83. *Purlin*
84. *Ridge Pole*
86. *Running Board*
86a. *Running Board Blocking*
91. *Fascia Board*
93. *Brake Wheel*
94. *Brake Shaft*
97. *Lower Brake Shaft Bearing*
100. *Brake Step*
101. *Brake Step Bracket*
210. *Uncoupling Lever and Rod*
A = *Inside Lining*
B = *Insulating Paper*
C = *Air Space*
D = *Hair Felt*
E = *Blind Lining*
F = *Outside Sheathing*
G = *Main Floor*
H = *Sub Floor*
I = *Blind Floor*
J = *Nailing Strip*
K = *Inside Ceiling*
L = *Blind Ceiling*
M = *Sub Roof*
N = *Plastic Roof*
O = *Sub Carline*
P = *Main Roof*
X = *Purlin*

NUMBERS REFER TO LIST OF NAMES WITH FIGS. 187-192.

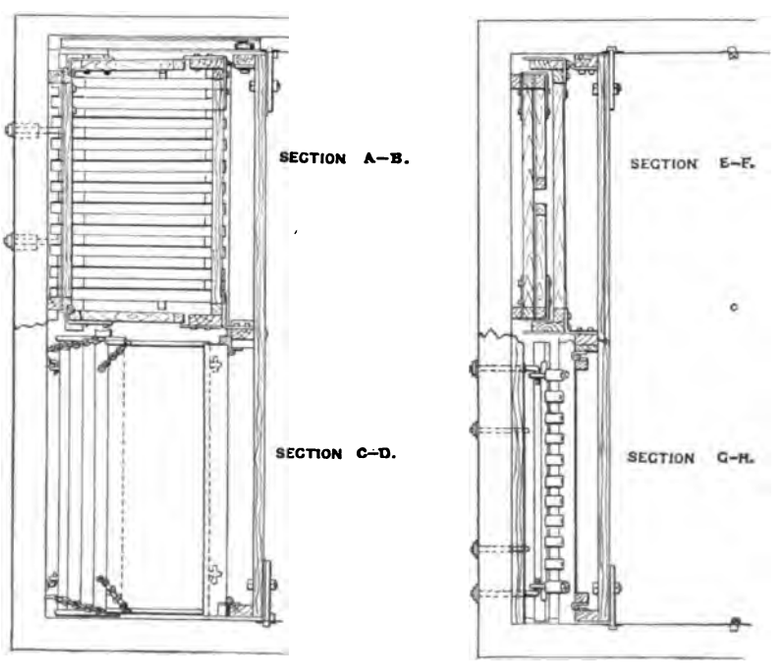

Double Ham. Fair
Paper
Center line of Draw Bar
Camber or center 1¼"
Double Hair Felt
Paper
¾" round
Paper
Double Hair Felt
Paper
Double Hair Felt
Paper
Paper
Paper



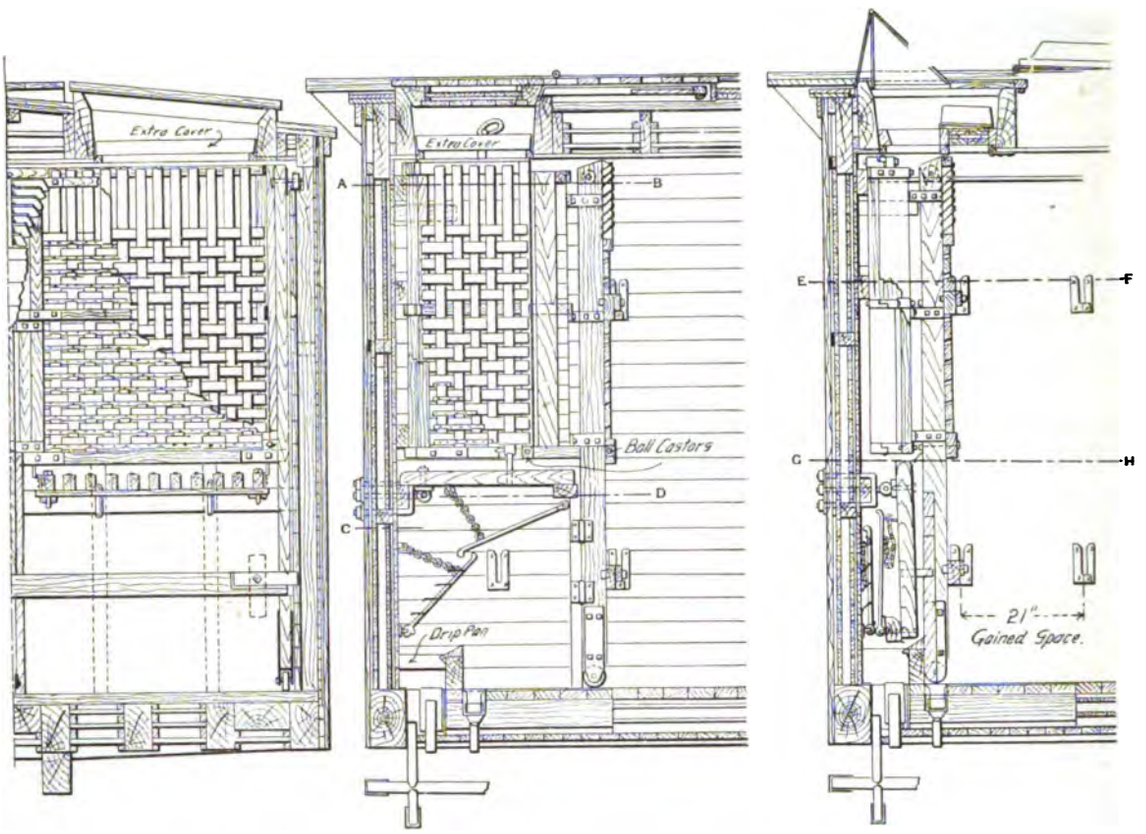
FIGS. 196-98. DETAILS OF BOHN SYSTEM OF REFRIGERATION.



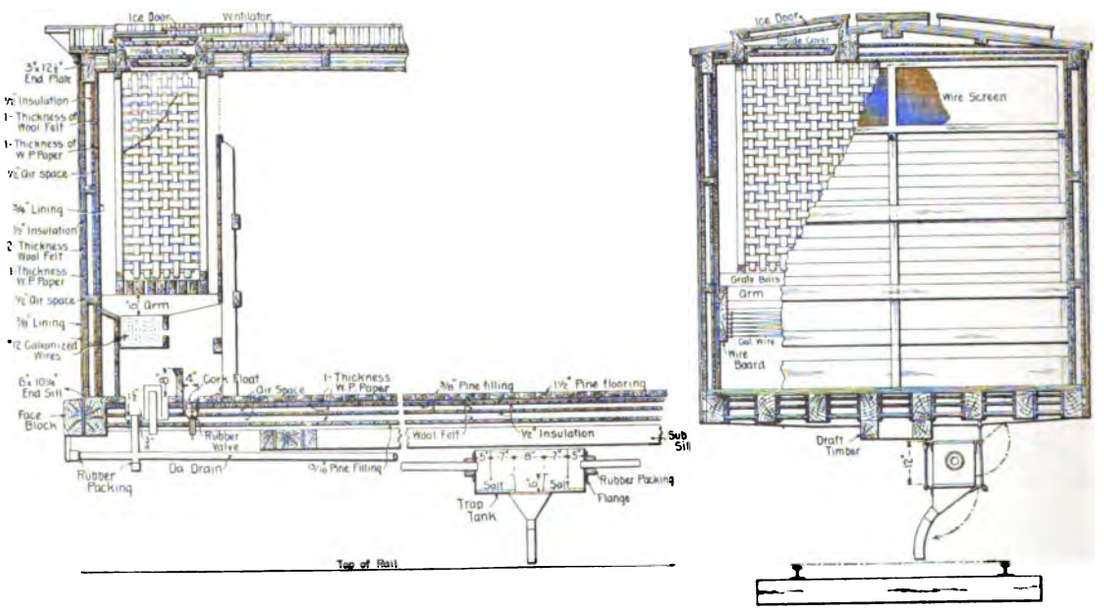
FIGS. 199-200. ARRANGEMENT OF PERMANENT FLOOR RACKS. JENINGS SYSTEM OF REFRIGERATION.



 FIGS. 201-202. COLLAPSIBLE ICE TANKS. JENINGS SYSTEM OF REFRIGERATION.

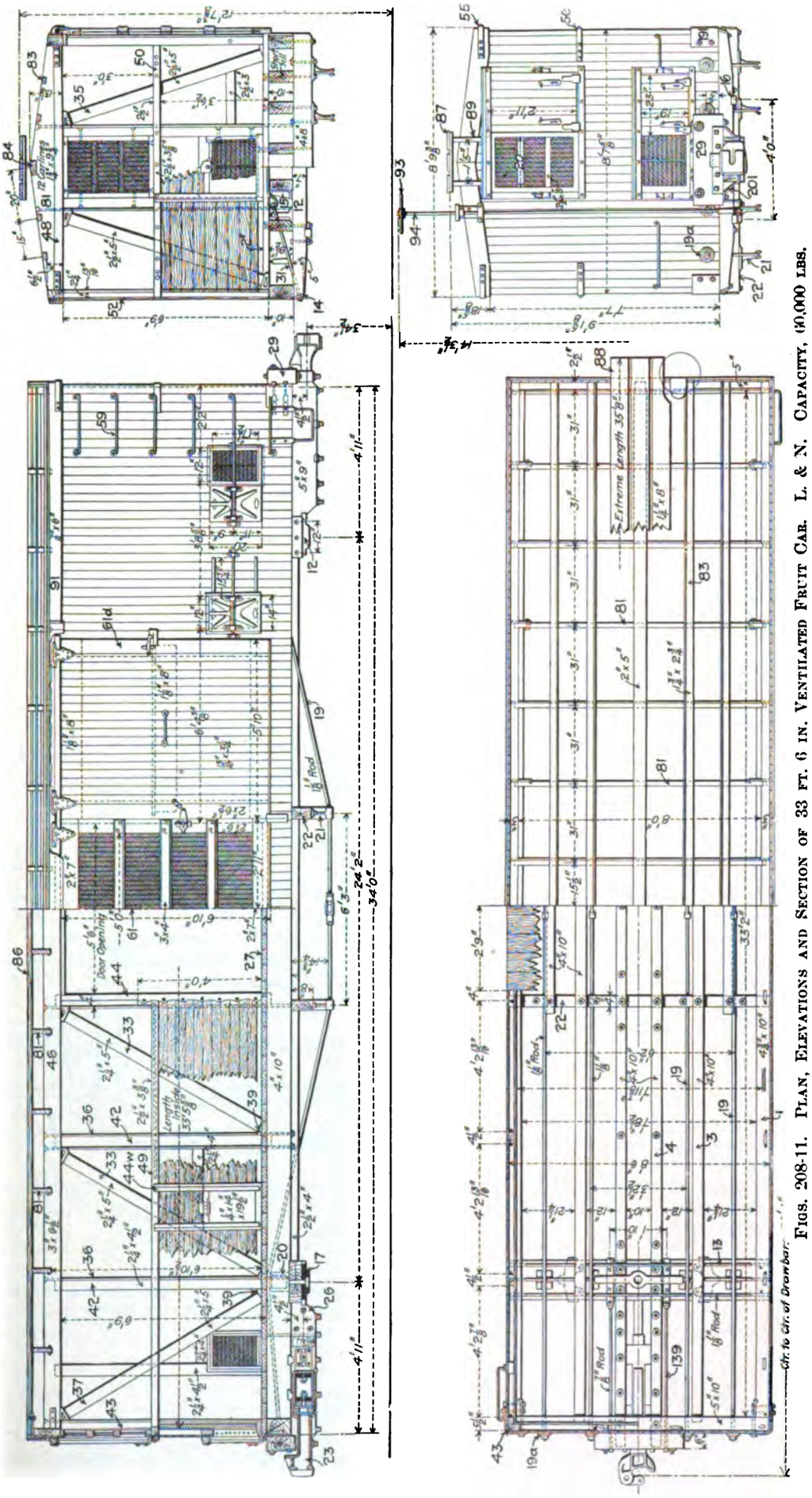


FIGS. 203-05. COLLAPSIBLE ICE TANKS. JENINGS SYSTEM OF REFRIGERATION.



FIGS. 206-07. DETAILS OF WICKES SYSTEM OF REFRIGERATION.

NUMBERS REFER TO LIST OF NAMES WITH FIG. 212.



FIGS. 208-11. PLAN, ELEVATIONS AND SECTION OF 33 FT. 6 IN. VENTILATED FRUIT CAR. L. & N. CAPACITY, 60,000 LBS.

List of Names of Parts of Fruit-Car Bodies. Figs. 208-11.

1. *Side Sill*
2. *End Sill*
3. *Inner Intermediate Sill*
4. *Center Sill*
12. *Body Bolster*
13. *Body Bolster Truss Rod*
14. *Body Bolster Truss Rod Washer*
15. *Body Bolster Truss Block*
17. *Body Center Plate*
19. *Body Truss Rod*
19a. *Body Truss Rod Washer*
20. *Body Truss Rod Saddle*
21. *Body Truss Rod Bearing*
22. *Cross Tie Timber*
23. *Drawbar*
26. *Draft Timber*
27. *Floor*
29. *Buffer Block*
31. *Same as* 13.
33. *Brace*
35. *End Brace*
36. *Sill and Plate Rod*
37. *Counterbrace*
39. *Brace Pocket*
42. *Post*
43. *Corner Post*
44. *Door Post*
44w. *Window Post*
46. *Plate*
48. *End Plate*
49. *Belt Rail*
50. *End Belt Rail*
52. *Sheathing or Siding*
55. *Upper Corner Plate*
56. *Middle Corner Plate*
59. *Ladder Round*
61. *Grated Door*
61d. *Door*
81. *Carline*
83. *Purlin*
84. *Ridge Pole*
86. *Roof Boards*
87. *Running Board*
88. *Running Board Extension*
89. *Running Board Bracket*
91. *Fascia Board*
93. *Brake Hand Wheel*
94. *Brake Shaft*
139. *Draw Gear Tie Rod*
191. *Push Pole Corner Iron*
201. *Drawbar Carry Iron*

Names of Parts of Stock-Car Bodies. Figs. 215-222.

1. *Side Sill*
2. *End Sill*
3. *Intermediate Sill*
3a. *Outer Intermediate Sill*
4. *Center Sill*
12. *Body Bolster*
19. *Body Truss Rod*
20. *Body Truss Rod Saddle*
21. *Body Truss Rod Bearing*
22. *Cross Tie Timber or Needlebeam*
26. *Draft Timbers*
27. *Floor*
28. *Upper Floor or Double Deck*
30. *Sill Step*
31. *Sill Step Stay*
32. *Buffer Blocks or Dead Wood*
33. *Side Brace*
35. *End Body Brace*
36. *Sill and Plate Rod*
37. *Counterbrace*

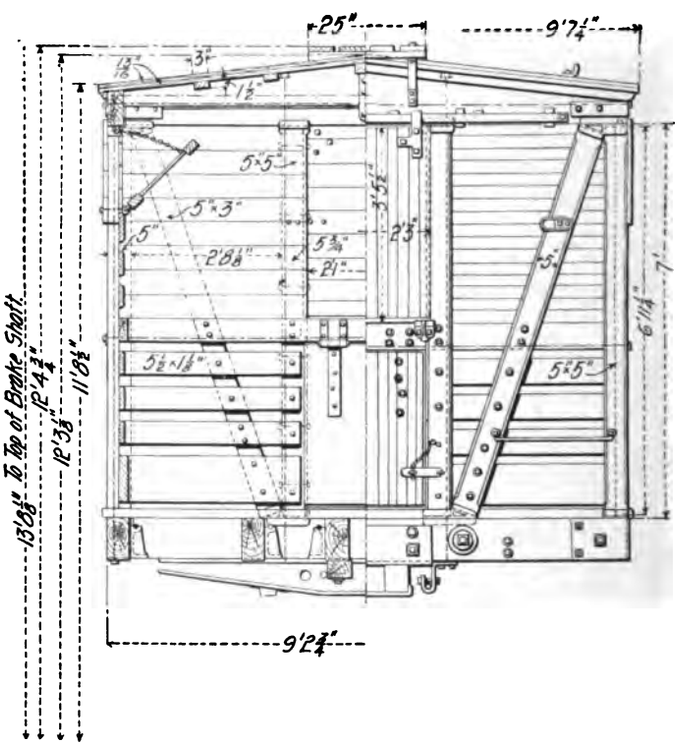


Fig. 212. Half Section and End Elevation of 36-ft. Stock-Car, I. C. R. R. Capacity, 60,000 lbs.

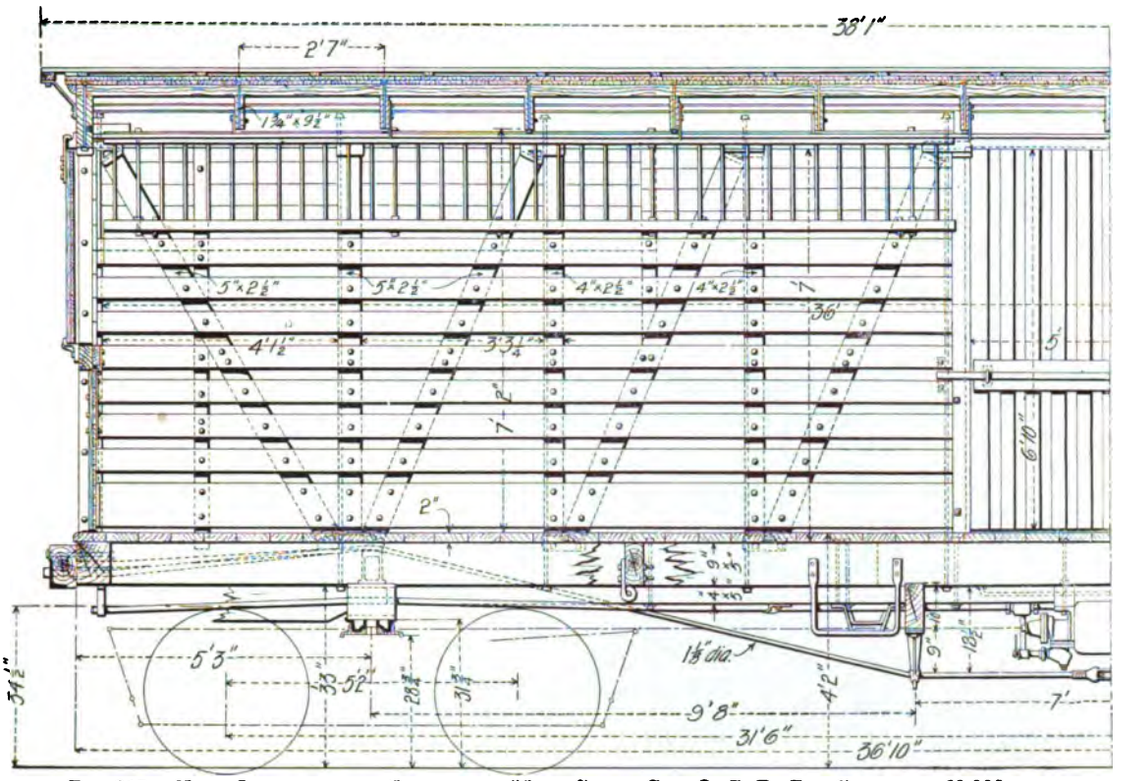


FIG. 213. HALF LONGITUDINAL SECTION OF 36-FT. STOCK CAR, I. C. R. R. CAPACITY, 60,000 LBS.

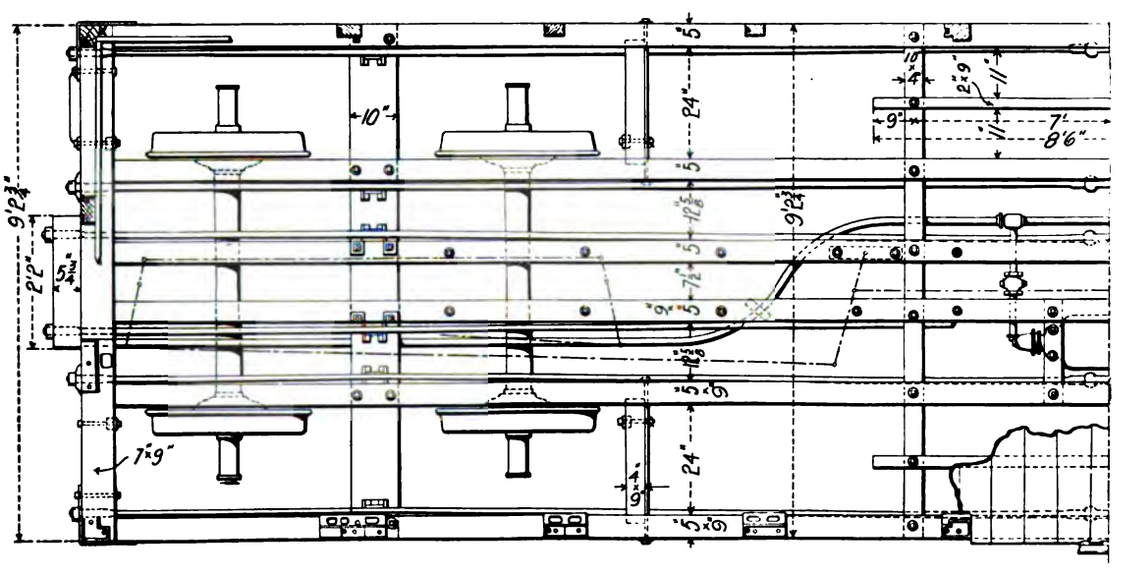
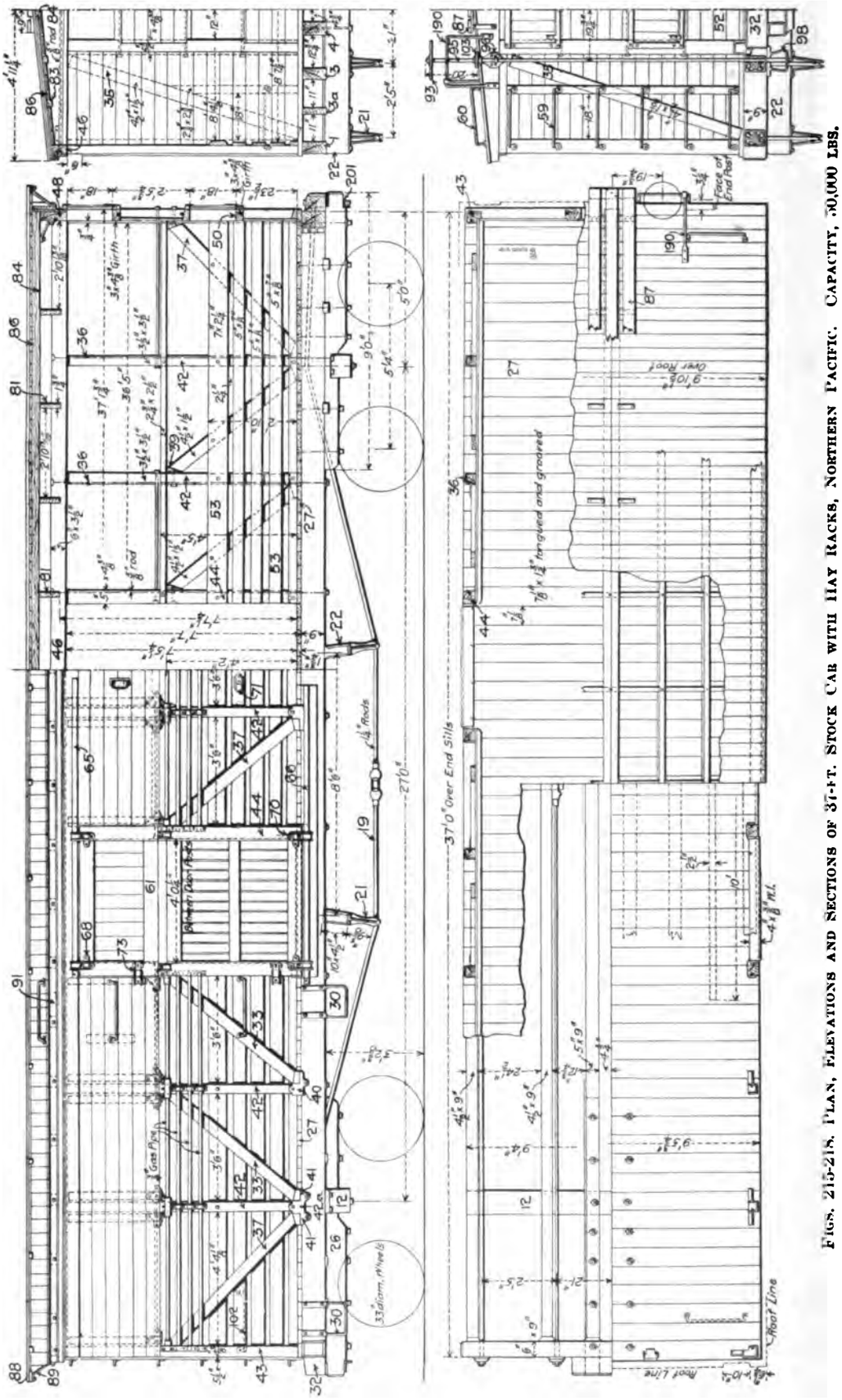


FIG. 214. PLAN OF FRAMING 36-FT. STOCK CAR, I. C. R. R. CAPACITY, 60,000 LBS.

NAMES OF PARTS OF STOCK CAR BODIES. FIGS. 215-222. (Continued.)

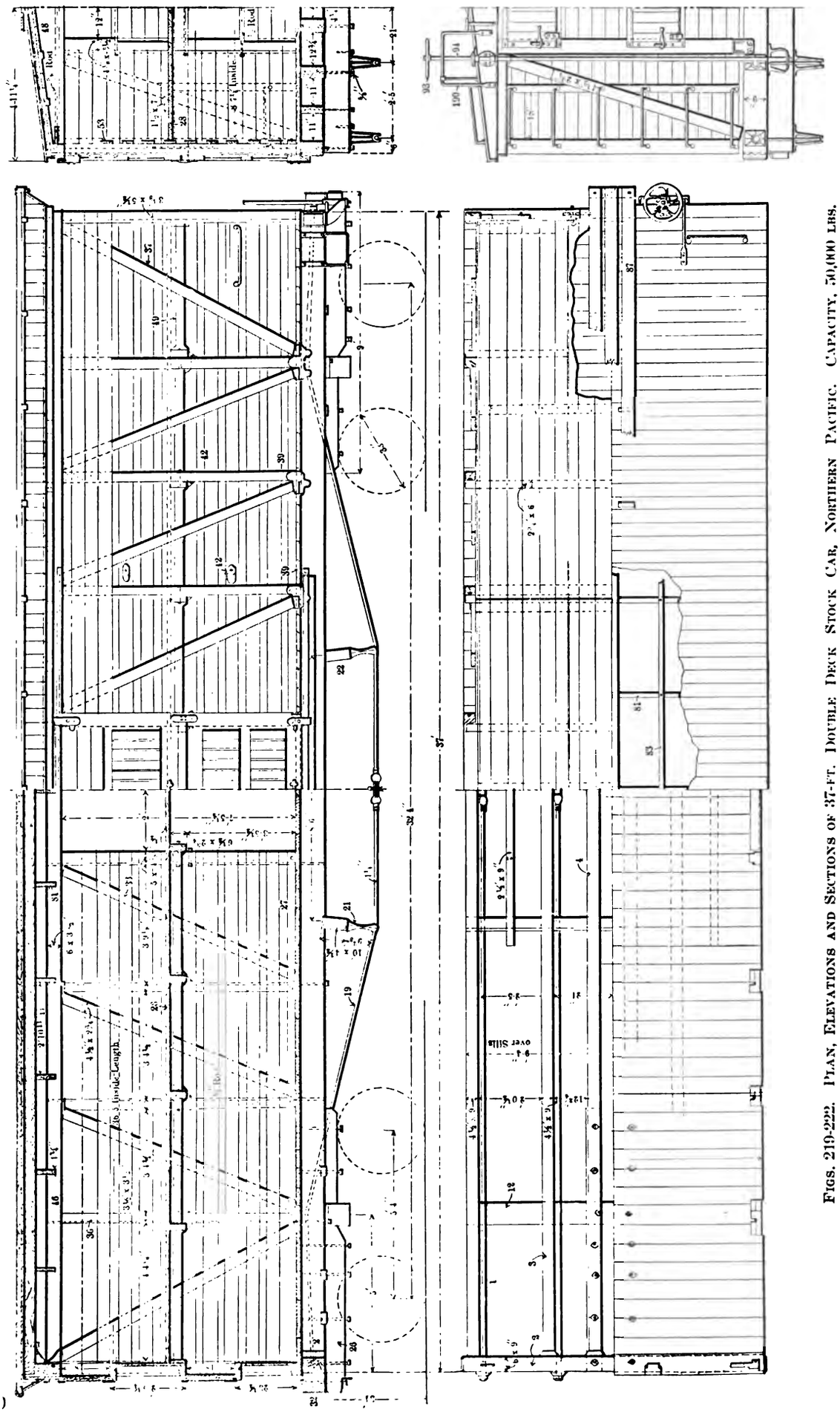
39. *Brace Pocket*
41. *Double Brace Pocket*
42. *Post*
42a. *Post Pocket*
43. *Corner Post*
44. *Door Post*
46. *Plate*
47. *Plate Rod*
48. *End Plate*
49. *Girth*
50. *End Girth*
52. *Sheathing*
53. *Inside Lining*
59. *Ladder Rounds*
60. *Roof Grab Iron*
61. *Grated Door*
65. *Top Door Track*
66. *Bottom Door Track*
67. *Door Track Bracket*
68. *Door Hanger*
70. *Door Shoe*
71. *Open Door Stop*
73. *Door Hasp*
81. *Carline*
83. *Purlin*
84. *Ridge Pole*
86. *Roof Boards*
87 *Running Board*
88. *Running Board Extension*
89. *Running Board Extension Bracket*
91. *Eaves Fascia Board*
93. *Brake Wheel*
94. *Brake Shaft*
95. *Same as* 94
96. *Brake Shaft Bearing*
98. *Brake Shaft Step*
99. *Brake shaft Bracket*
102. *Hand Hold*
103. *Brake Ratchet Wheel*
190. *Brake Hand Rail*
201. *Drawbar Carry Iron*
210. *Uncoupling Lever*

NUMBERS REFER TO LIST OF NAMES WITH FIG. 212.

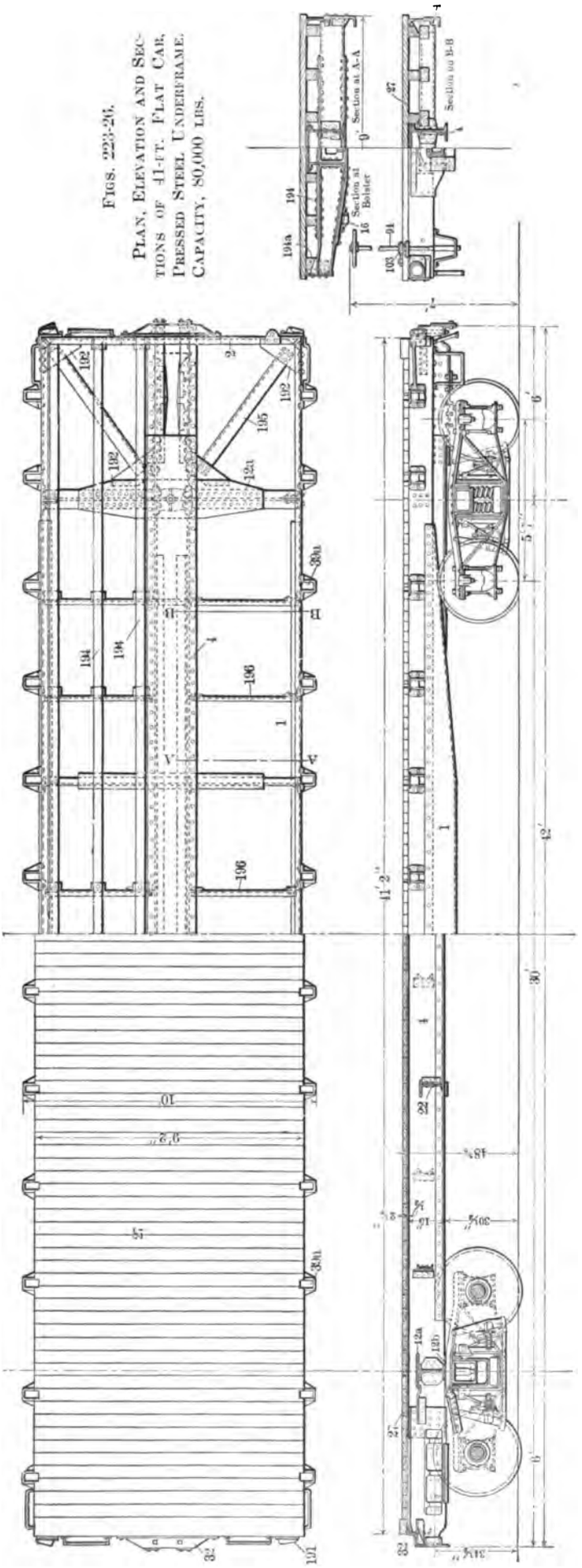


FIGS. 215-218. PLAN, ELEVATIONS AND SECTIONS OF 37-FT. STOCK CAR WITH HAY RACKS, NORTHERN PACIFIC. CAPACITY, 50,000 LBS.

NUMBERS REFER TO LIST OF NAMES WITH FIG. 212.

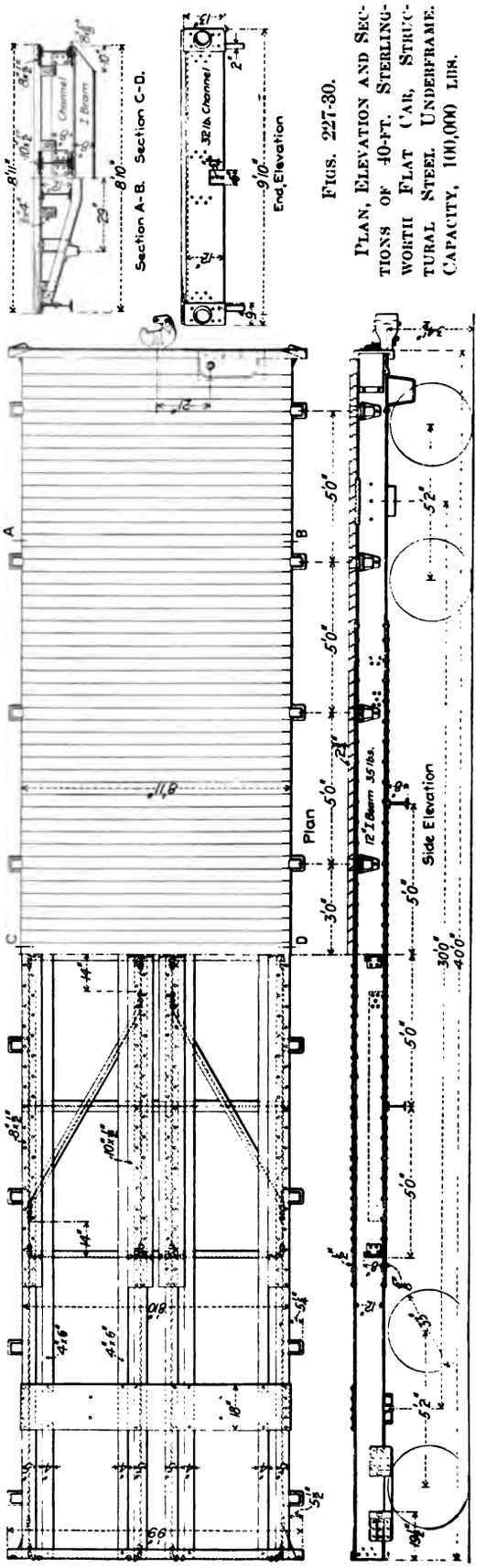


FIGS. 219-222. PLAN, ELEVATIONS AND SECTIONS OF 37-FT. DOUBLE DECK STOCK CAR, NORTHERN PACIFIC. CAPACITY, 50,000 LBS.

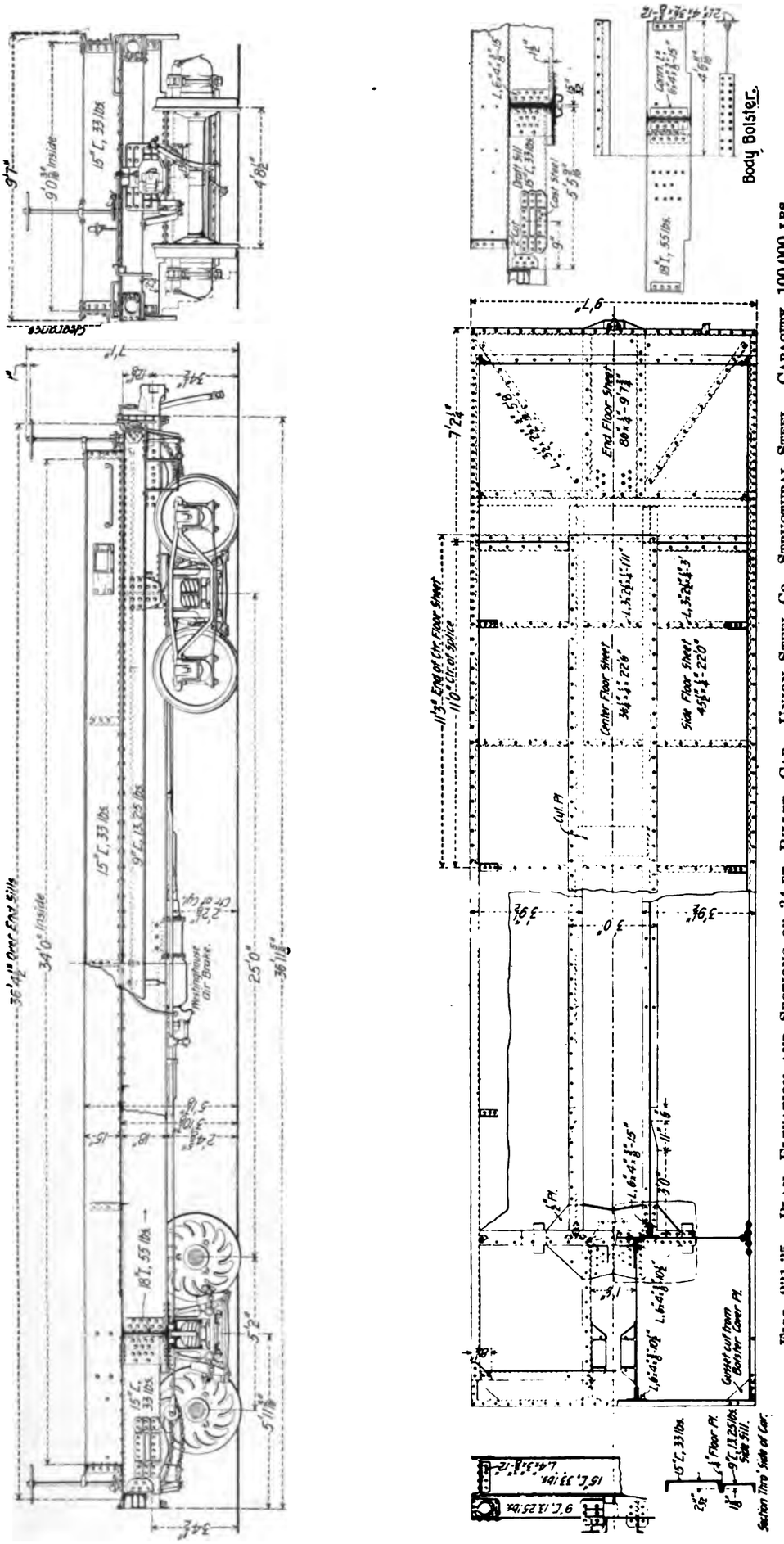


FIGS. 223-26.
PLAN, ELEVATION AND SECTIONS OF 41-FT. FLAT CAR. PRESSED STEEL UNDERFRAME. CAPACITY, 80,000 LBS.

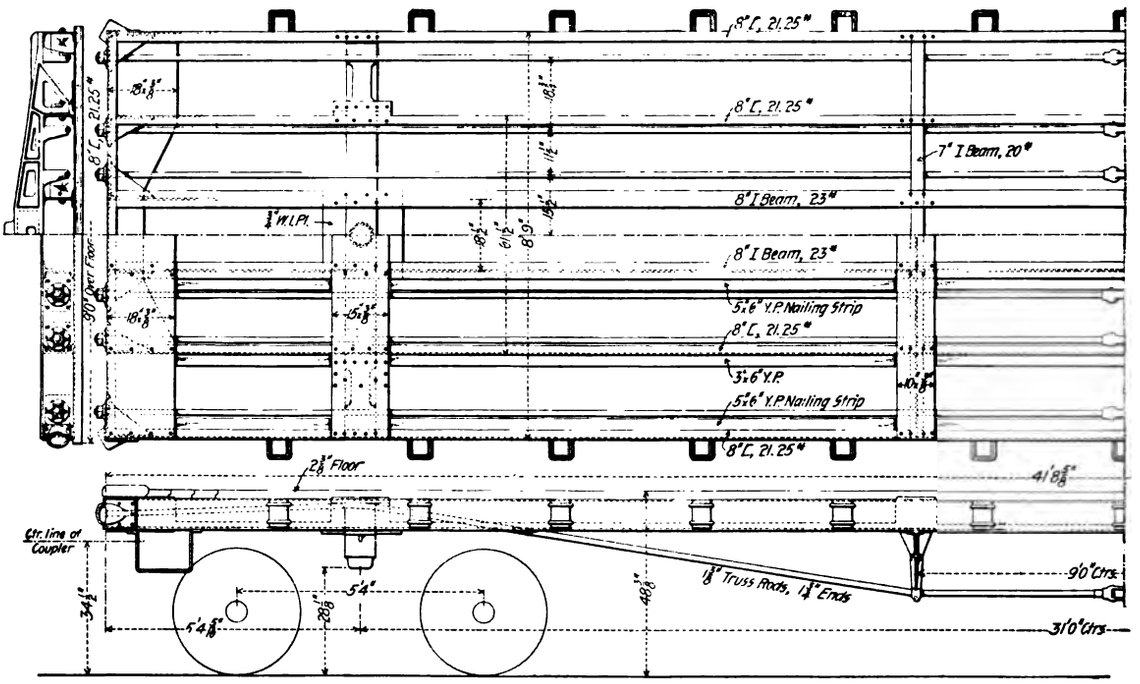
NUMBERS REFER TO LIST OF NAMES WITH FIGS. 236-38.



FIGS. 227-30.
PLAN, ELEVATION AND SECTIONS OF 40-FT. STERLINGWORTH FLAT CAR, STRUCTURAL STEEL UNDERFRAME. CAPACITY, 100,000 LBS.



FIGS. 231-35. PLAN, ELEVATION AND SECTIONS OF 34-FT. BILLET CAR. UNION STEEL CO. STRUCTURAL STEEL. CAPACITY, 100,000 LBS.



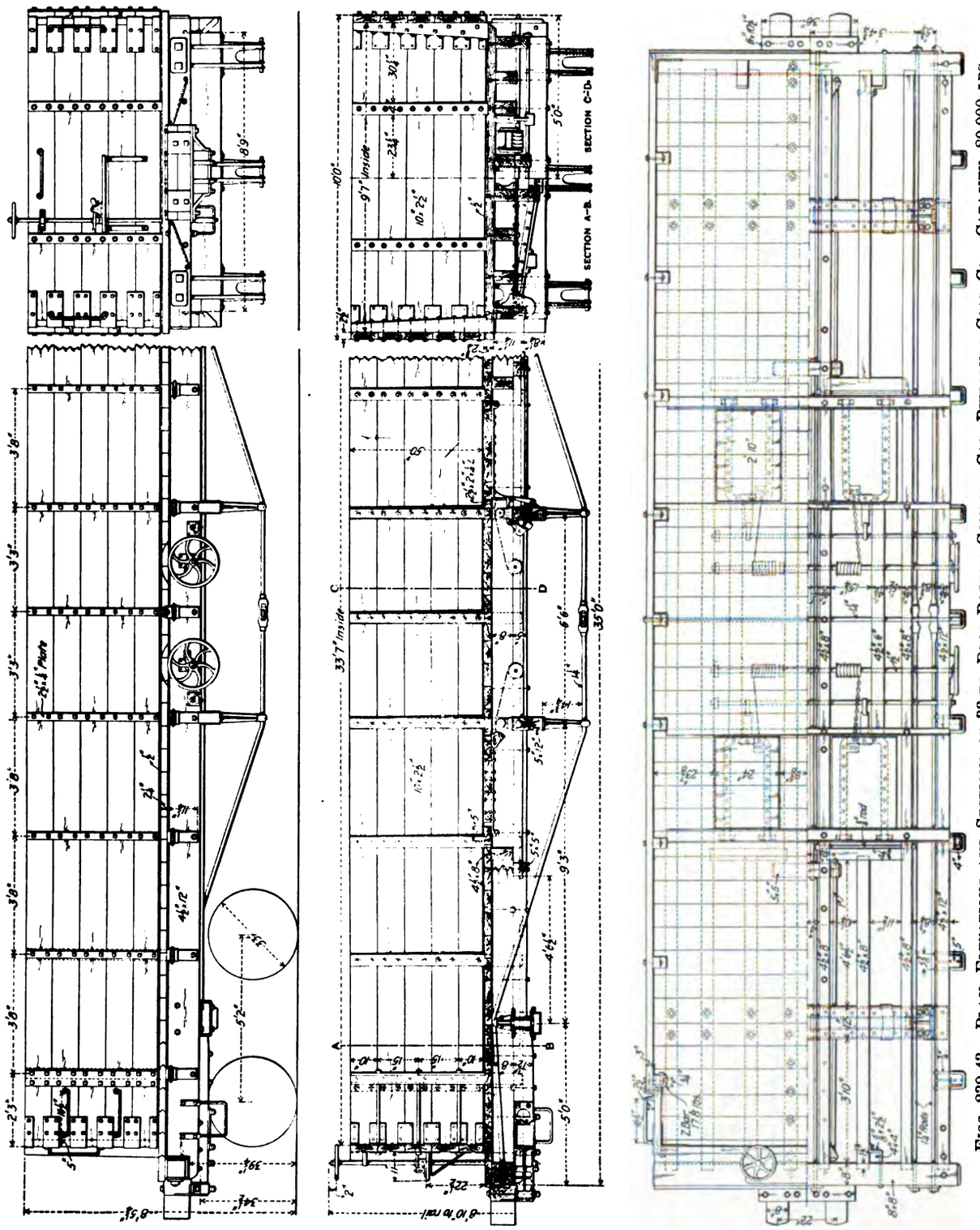
FIGS. 236-38. PLAN AND ELEVATION OF 41-FT. 8-IN. FLAT CAR, C. & A. STRUCTURAL STEEL UNDERFRAME. CAPACITY, 100,000 LBS.

NAMES OF PARTS OF FLAT CAR. FIGS. 223-226.

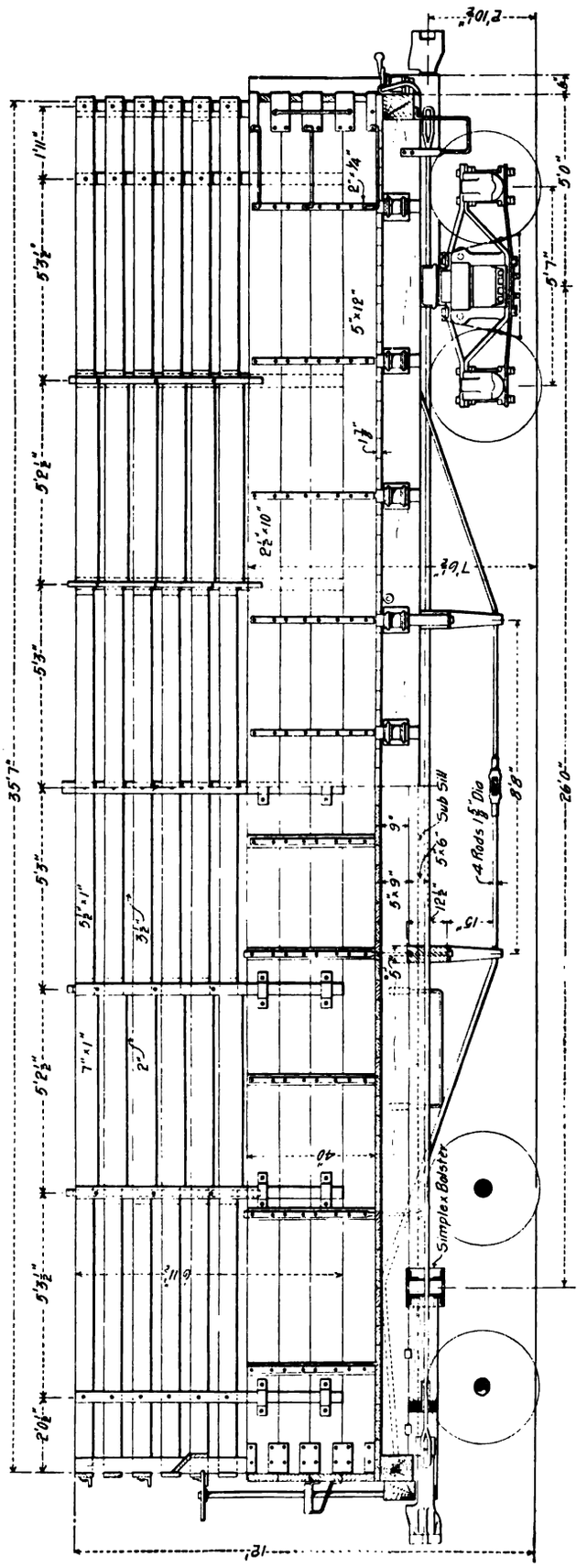
1. *Side Sill*
2. *End Sill*
4. *Center Sill*
12. *Body Bolster*
12a. *Top Plate of Body Bolster*
12b. *Bottom Plate of Body Bolster*
16. *Body Side Bearings.*
22. *Cross Tie Timber or Needle Beam*
27. *Floor*
32. *Buffer Blocks*
39a. *Stake Pocket*
103. *Brake Ratchet Wheel*
192. *Gusset Plates*
194. *Nailing Strips*
194a. *Side Nailing Strip*
195. *End Sill Diagonal Brace*
196. *Nailing Strip Cross Ties*

NAMES OF PARTS OF GONDOLA CARS. FIGS. 246-50.

1. *Side Sill*
2. *End Sill*
3. *Inner Intermediate Sill*
4. *Outer Intermediate Sill*
5. *Center Sill.*
6. *Sub Center Sill*
10. *Sill Tie Rod*
12. *Body Bolster*
16. *Body Side Bearing*
17. *Body Center Plate*
19. *Body Truss Rod*
20. *Body Truss Rod Saddle*
21. *Body Truss Rod Bearing*
23. *Drawbar*
24. *Draft Spring*
25. *Cross Tie Timber or Needle Beam*
26. *Draft Timbers*
27. *Floor*
32. *Buffer Blocks*
32a. *Buffer Beam*
39. *Stake Pocket*
42. *Stake*
52. *Side Plank*
93. *Brake Wheel*
94. *Brake Shaft*
96. *Upper Brake Shaft Bearing*
100. *Brake Shaft Step*
102. *Hand Hold*
103. *Brake Ratchet Wheel*
210. *Uncoupling Lever and Rod*

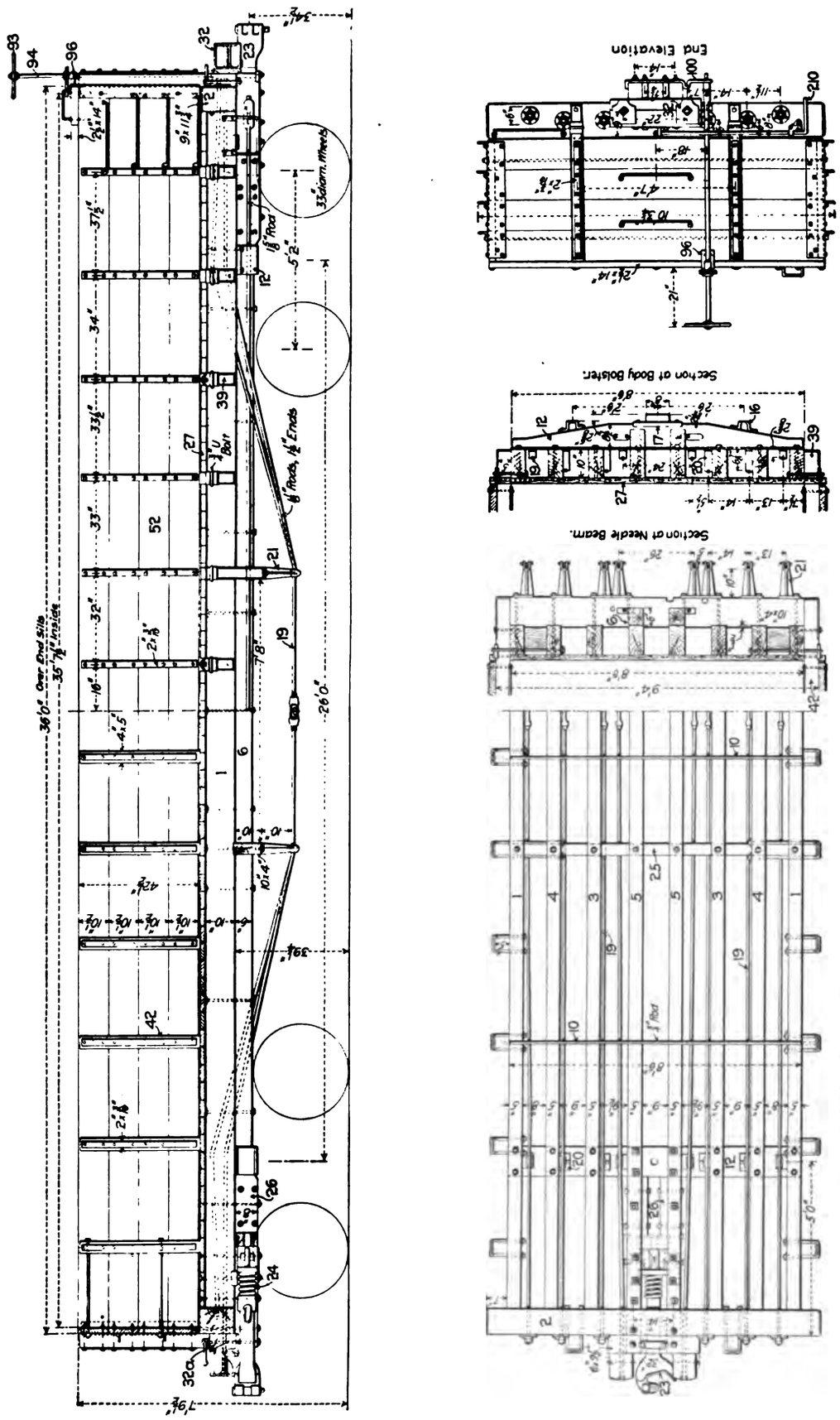


FIGS. 239-43. PLAN, ELEVATIONS AND SECTIONS OF 33-FT. DROP BOTTOM GONDOLA CAR, PITTSBURG COAL CO. CAPACITY, 80,000 LBS.

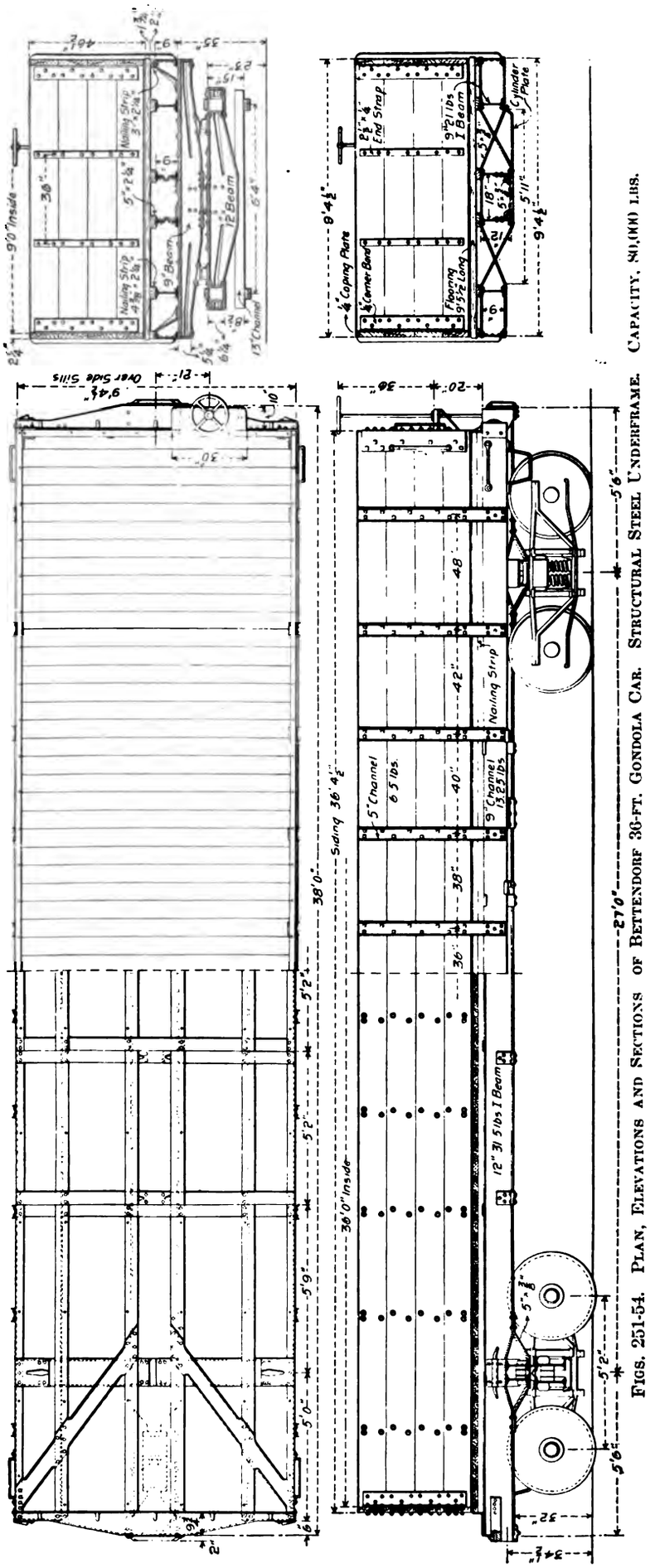


FIGS. 244-45. PLAN AND ELEVATION OF 36-FT. GONDOLA CAR WITH RACK FOR COKE. SOLVAY PROCESS CO. CAPACITY, 80,000 LBS.

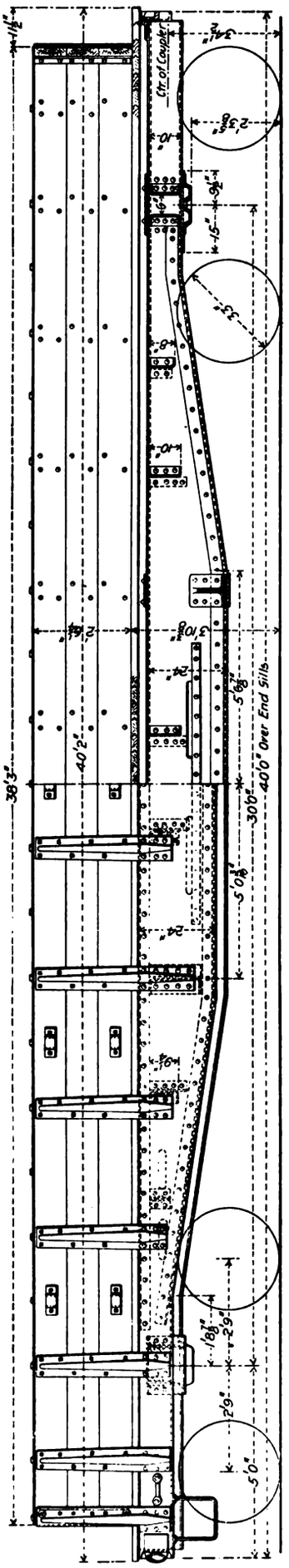
NUMBERS REFER TO LIST OF NAMES WITH FIGS. 236-38.

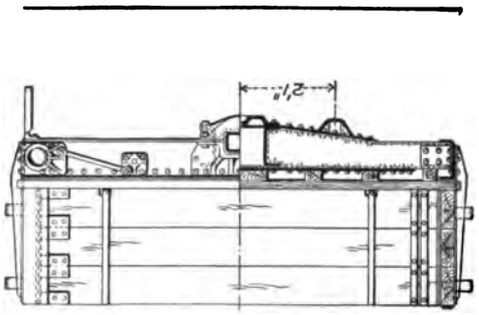


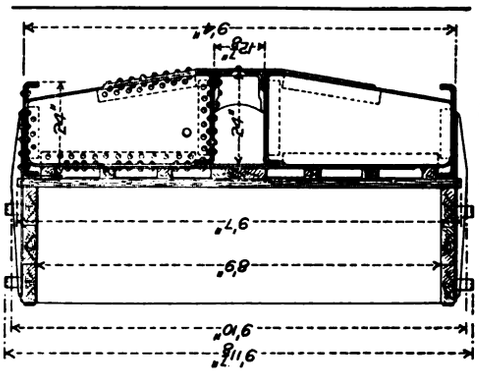
FIGS. 246-50. PLAN, ELEVATION AND SECTIONS OF 36-FT. GONDOLA CAR. C. & E. I. CAPACITY, 80,000 LBS.

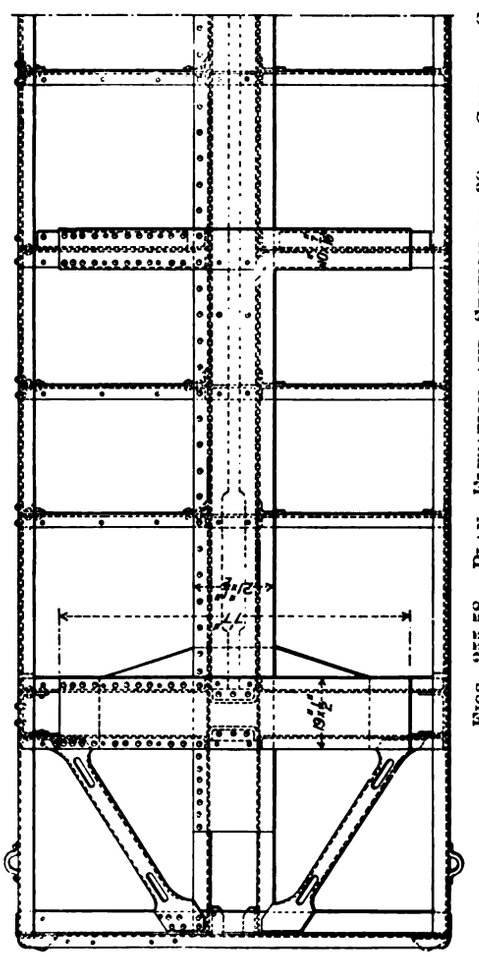


FIGS. 251-54. PLAN, ELEVATIONS AND SECTIONS OF BETTENDORF 30-FT. GONDOLA CAR. STRUCTURAL STEEL UNDERFRAME. CAPACITY, 80,000 LBS.

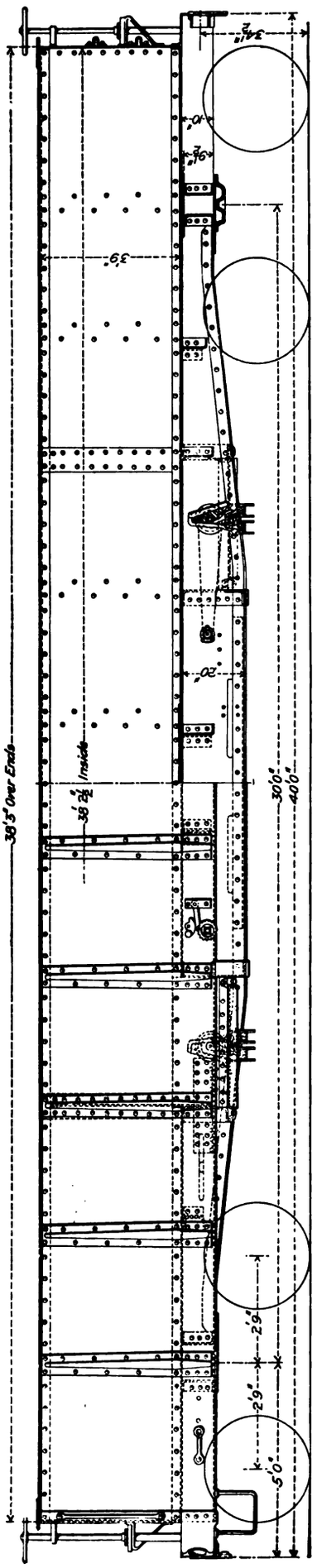


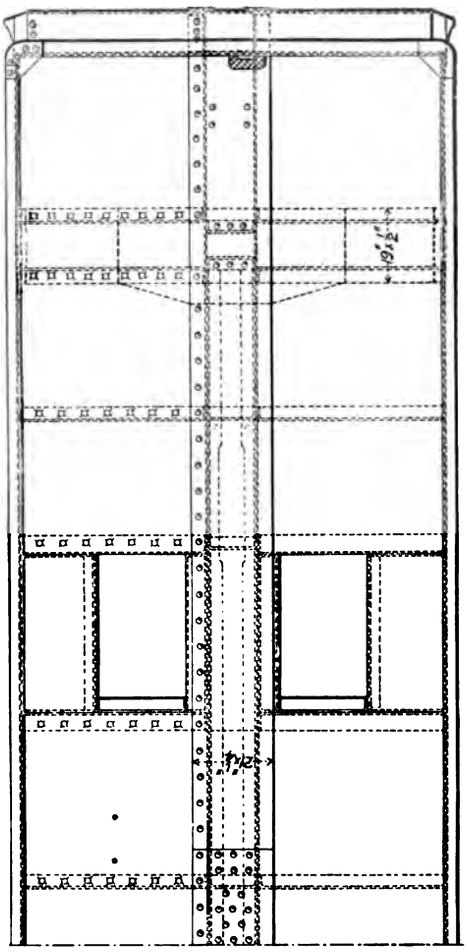


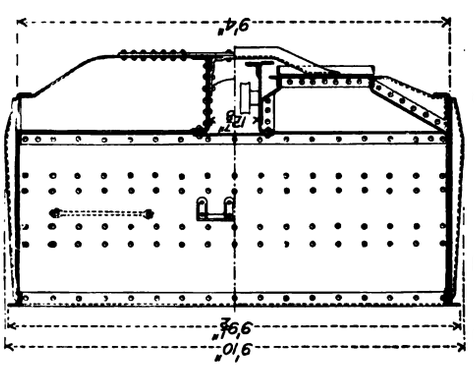


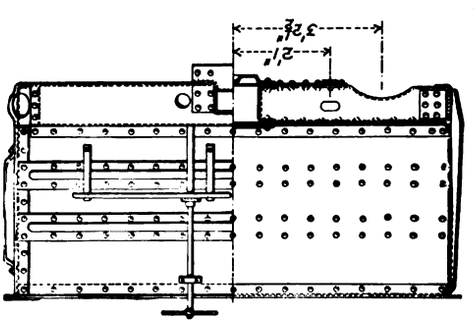


FIGS. 255-58. PLAN, ELEVATION AND SECTION OF 38-T. GONDOLA CAR. P. R. R. PRESSED STEEL UNDERFRAME. CAPACITY, 100,000 LBS.

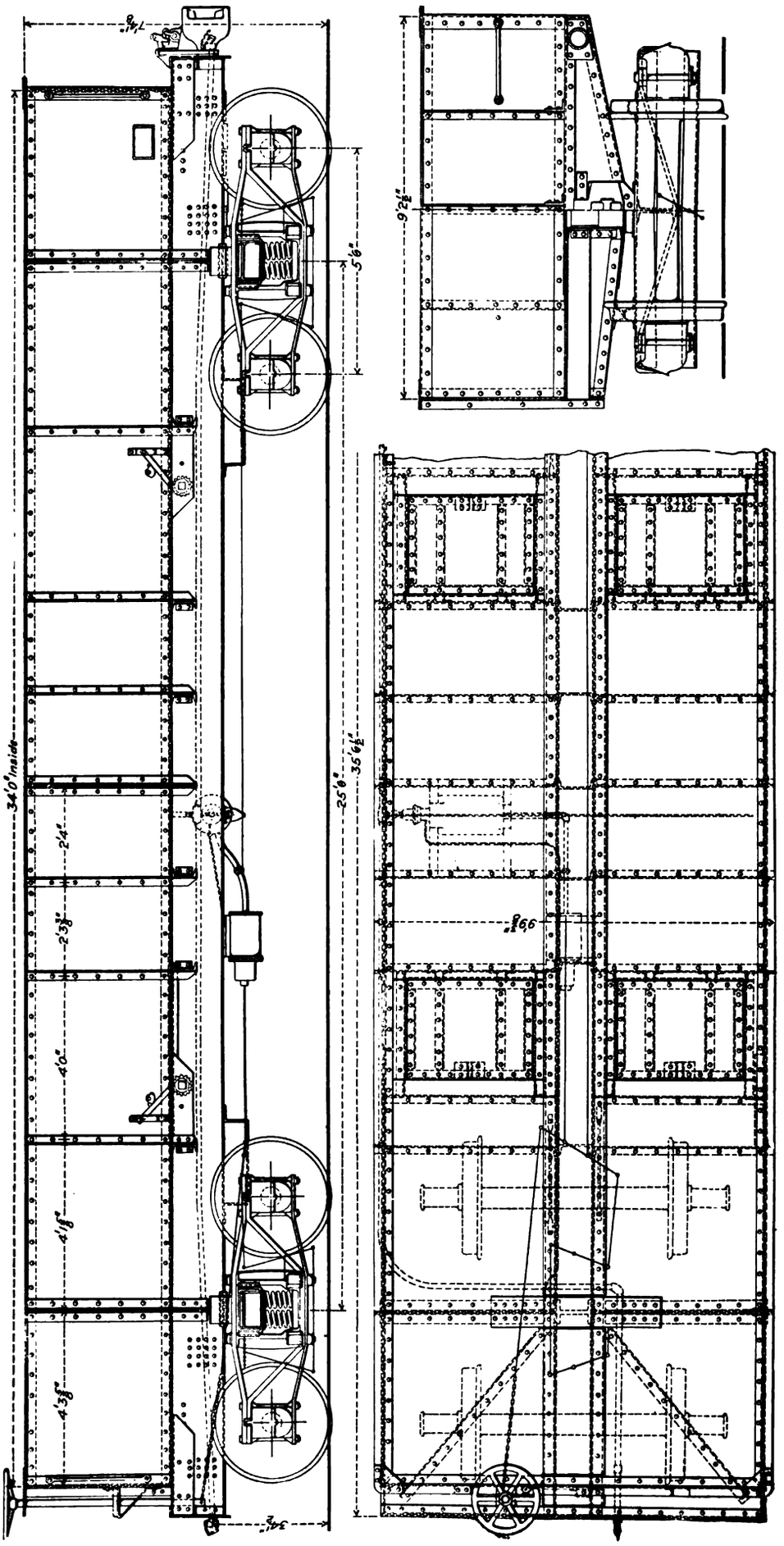




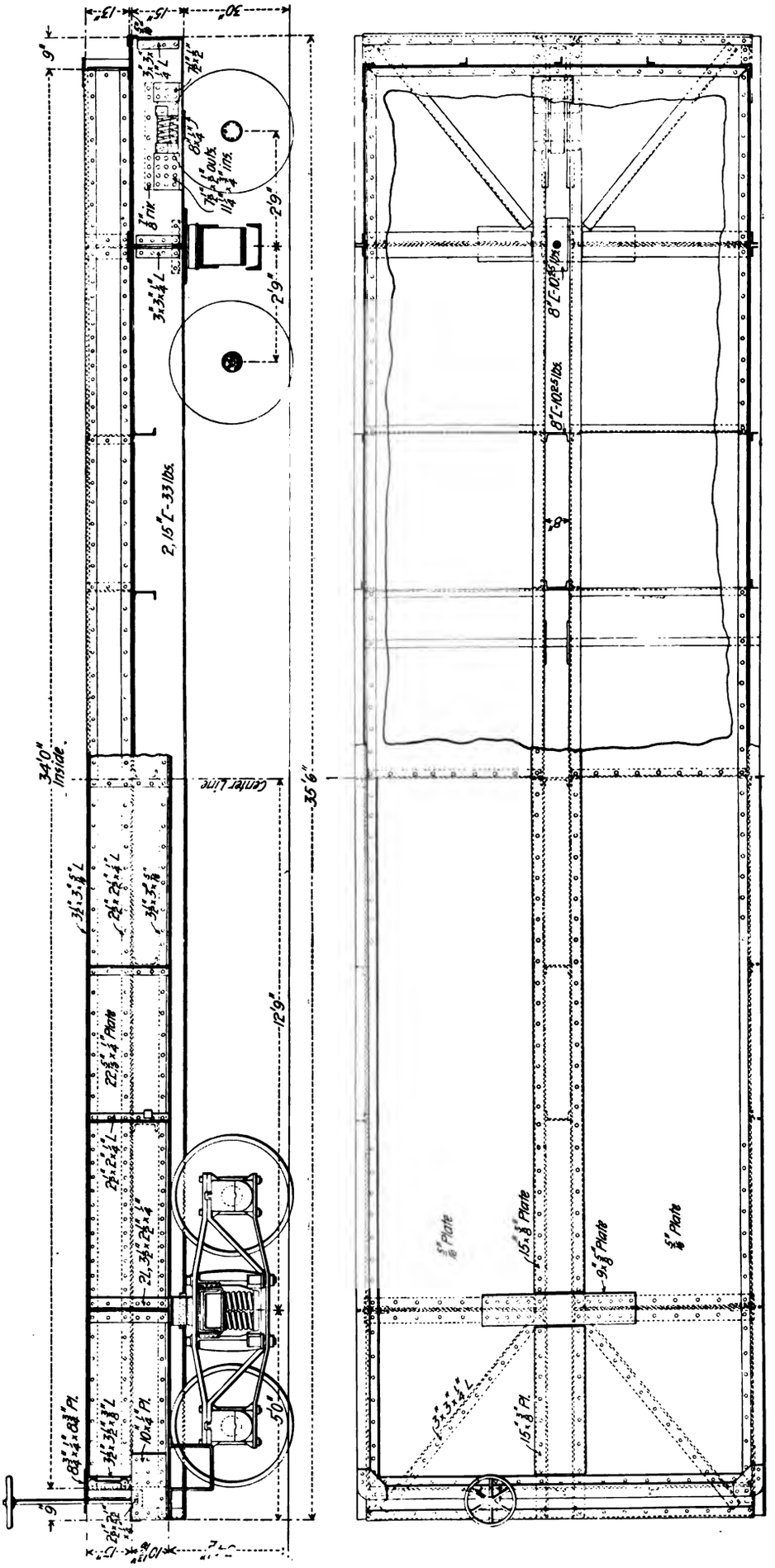




FIGS. 259-62. PLAN, ELEVATION AND SECTIONS 38-FT. GONDOLA CAR, P. R. R. PRESSED STEEL. CAPACITY, 100,000 LBS.



FIGS. 263-65. PLAN AND ELEVATIONS OF 34-FT. DROP BOTTOM GONDOLA CAR, P. & R. STRUCTURAL STEEL. CAPACITY, 100,000 LBS.



FIGS. 266-67. PLAN AND ELEVATION OF 34-FT. LOW SIDE GONDOLA. STRUCTURAL STEEL. CAPACITY, 100,000 LBS.

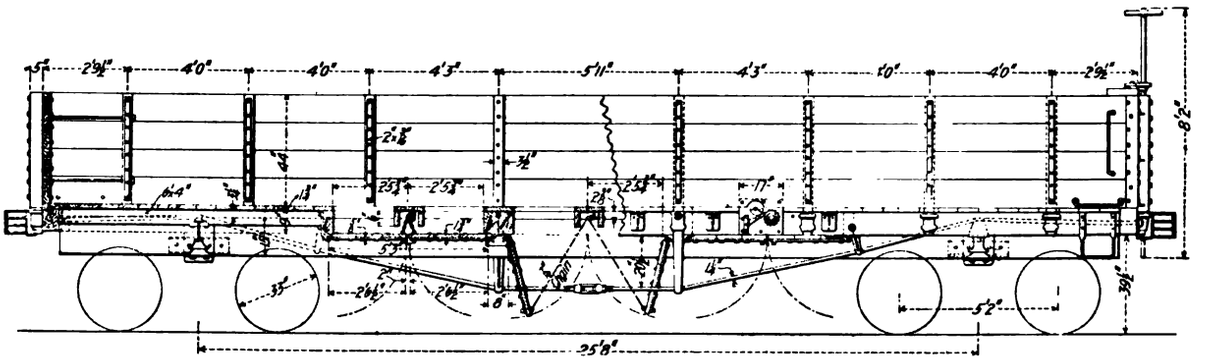


FIG. 268. HALF SIDE ELEVATION AND SECTION, TRIPLE DROP BOTTOM GONDOLA CAR, STEEL CHANNEL CENTER SILLS, A., T. & S. F. CAPACITY, 80,000 LBS.

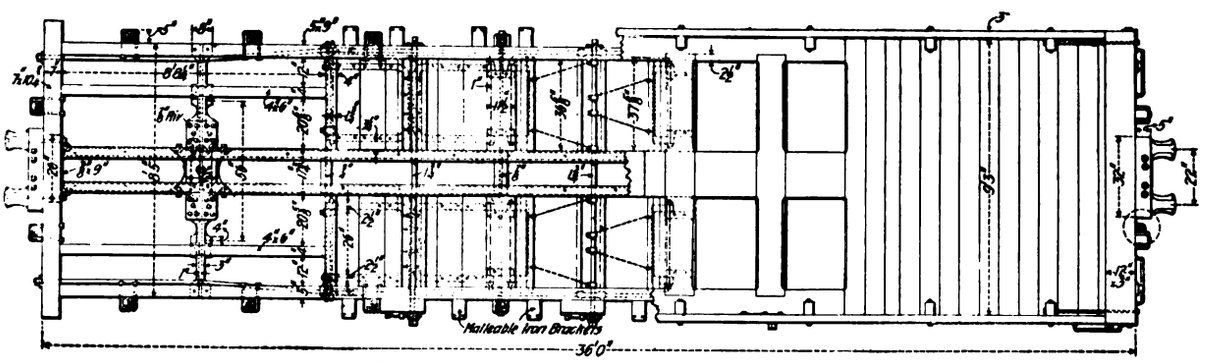


FIG. 269. HALF FLOOR PLAN AND FRAMING.

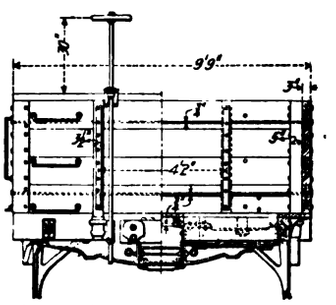
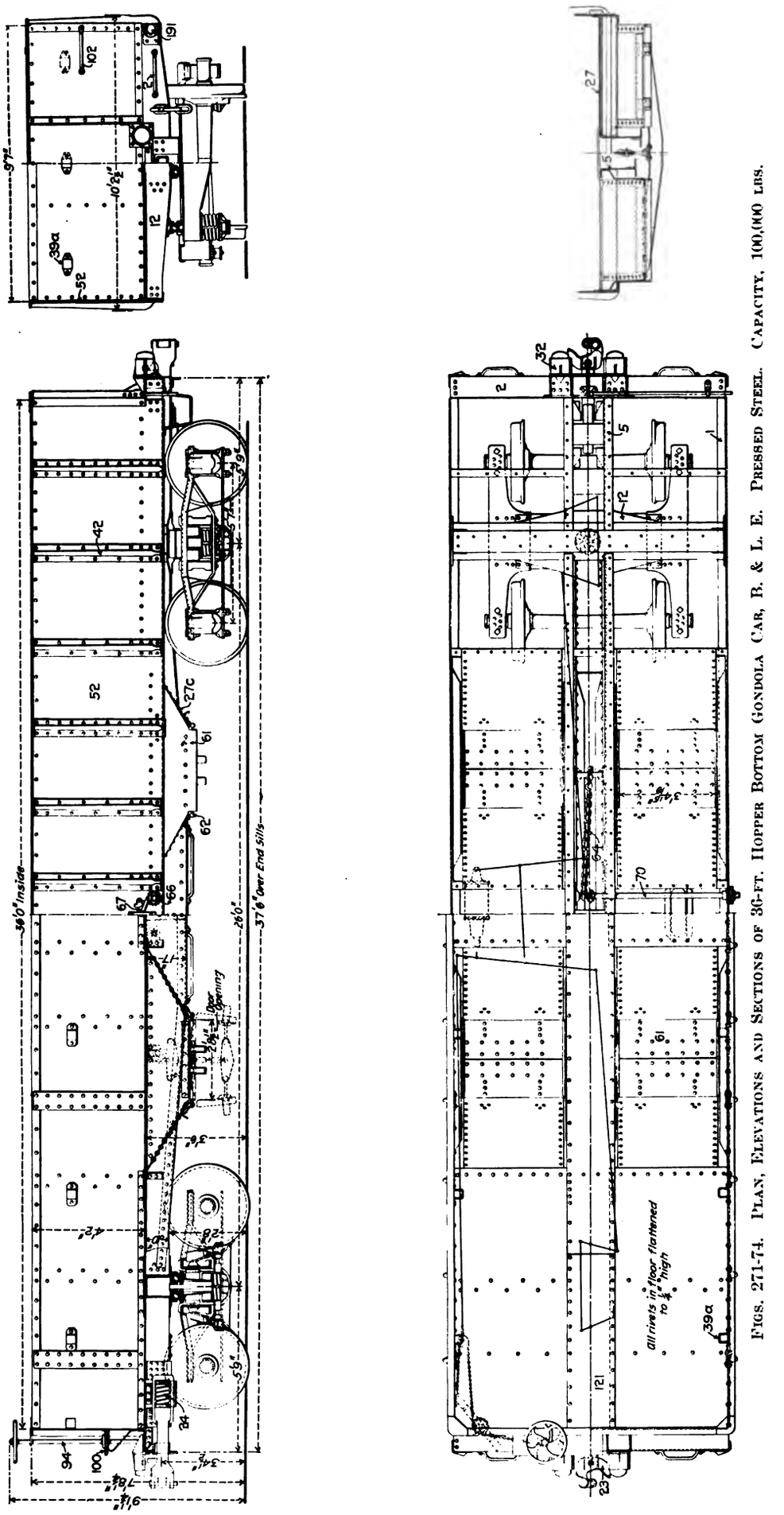


FIG. 270. END ELEVATION.

NAMES OF PARTS OF HOPPER GONDOLA AND HOPPER CARS. FIGS. 271-278, 287-295.

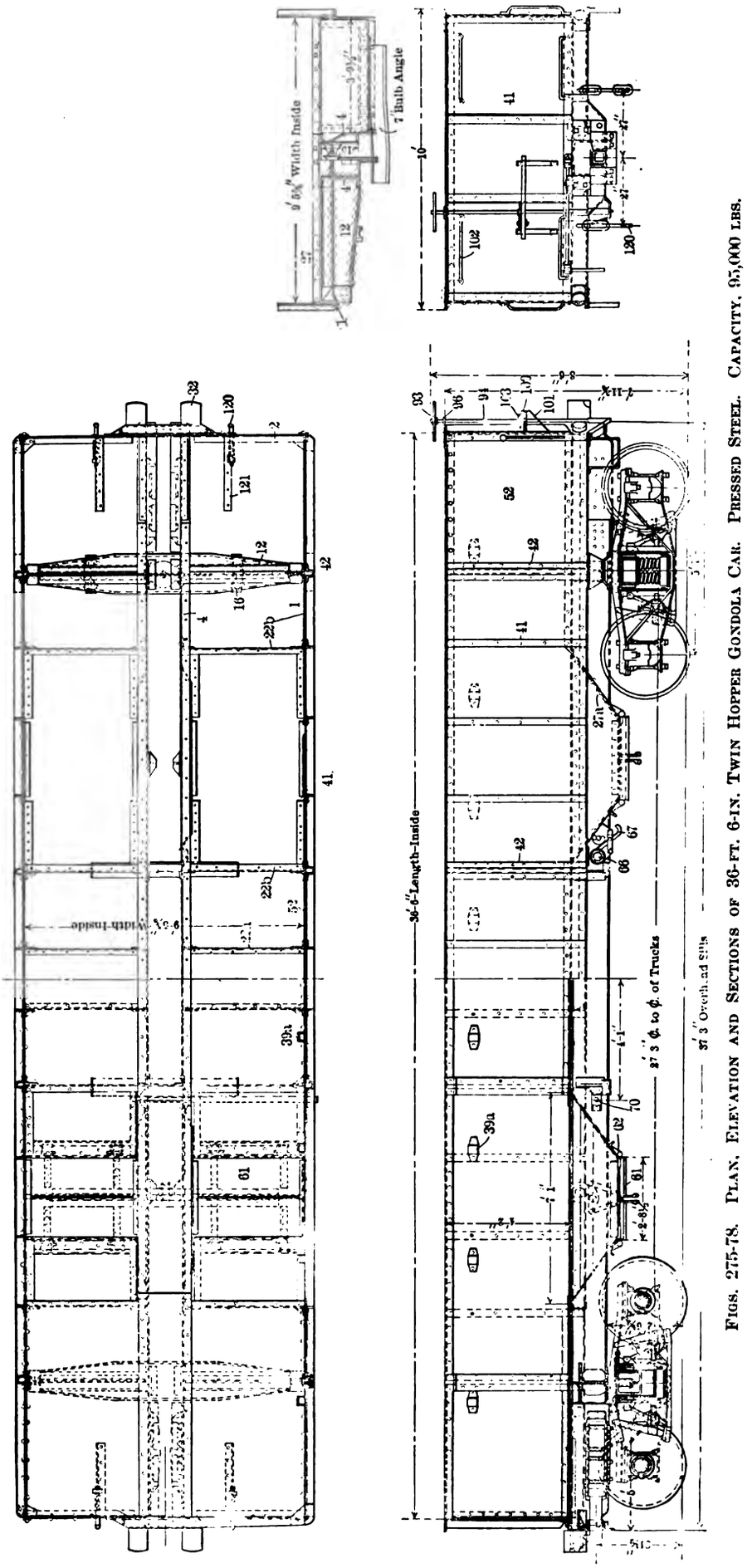
1. *Side Sill*
2. *End Sill*
5. *Center Sill*
8. *Corner Post*
10. *Sill Tie Rod*
11. *End Sill Diagonal Brace*
12. *Body Bolster*
12a. *Top Plate of Body Bolster*
12b. *Bottom Plate of Body Bolster*
16. *Body Side Bearing*
17. *Body Center Plate*
19. *Body Truss Rod*
20. *Body Truss Rod Saddle*
21. *Body Truss Rod Bearing*
22. *Cross Tie or Needle Beam*
23. *Drawbar*
24. *Draft Spring*
26. *Draft Timbers*
27. *Floor*
27a. *End Slope*
27b. *Side Slope*
27c. *Hopper Slope*
27d. *Same as 27c*
28. *Bracket Steps*
30. *Sill Step*
32. *Buffer Blocks*
39. *Stake Pocket*
41. *Side Plate Stiffening Angle*
42. *Stake*
43. *Side strut for Hopper Floor*
44. *Side Strut Angle Tie*
45. *Hopper Support*
46. *Center Strut for Hopper Floor*
47. *End Post*
52. *Side Plank or Sheet*
61. *Drop Door*
62. *Drop Door Hinge*
63. *Drop Door Eye Bolt*
64. *Drop Door Chain*
65. *Drop Door Chain Ring*
66. *Winding Shaft Ratchet Wheel*
67. *Winding Shaft Ratchet Pawl*
70. *Winding Shaft*
74. *Door Pin*
93. *Brake Wheel*
94. *Brake Shaft*
96. *Upper Brake Shaft Bearing*
100. *Brake Step*
101. *Brake Step Bracket*
102. *Hand Hold*
103. *Brake Ratchet Wheel*
104. *Hopper Door Toggle Arm*
105. *Hopper Door Toggle Link*
120. *Safety Chain*
121. *Center Sill Cover Plate*
191. *Push Pole Corner Iron*
192. *Gusset Plates*
195. *End Sill Diagonal Brace*
210. *Uncoupling Lever and Rod*

NUMBERS REFER TO LIST OF NAMES WITH FIGS. 268-70.

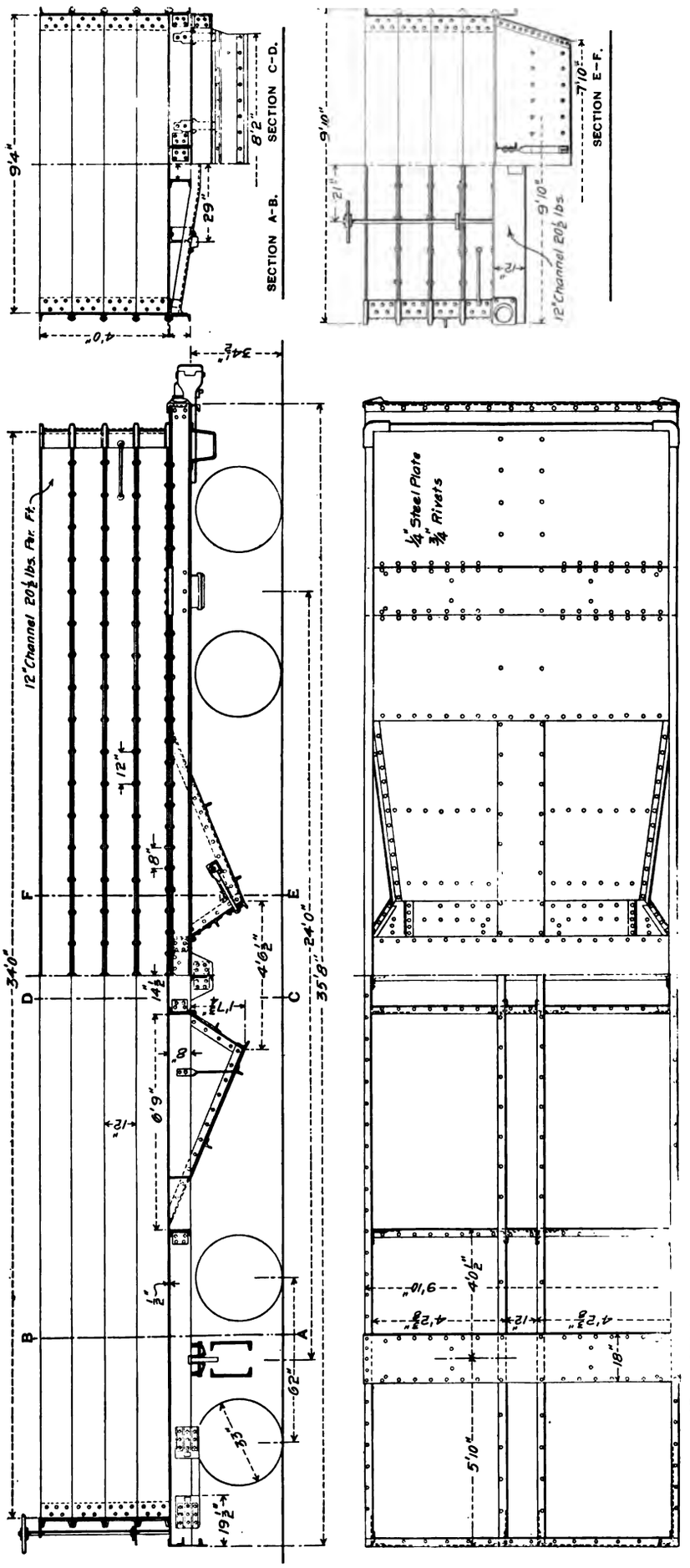


FIGS. 271-74. PLAN, ELEVATIONS AND SECTIONS OF 36-FT. HOPPER BOTTOM GONDOLA CAR, B. & L. E. PRESSED STEEL. CAPACITY, 100,000 LBS.

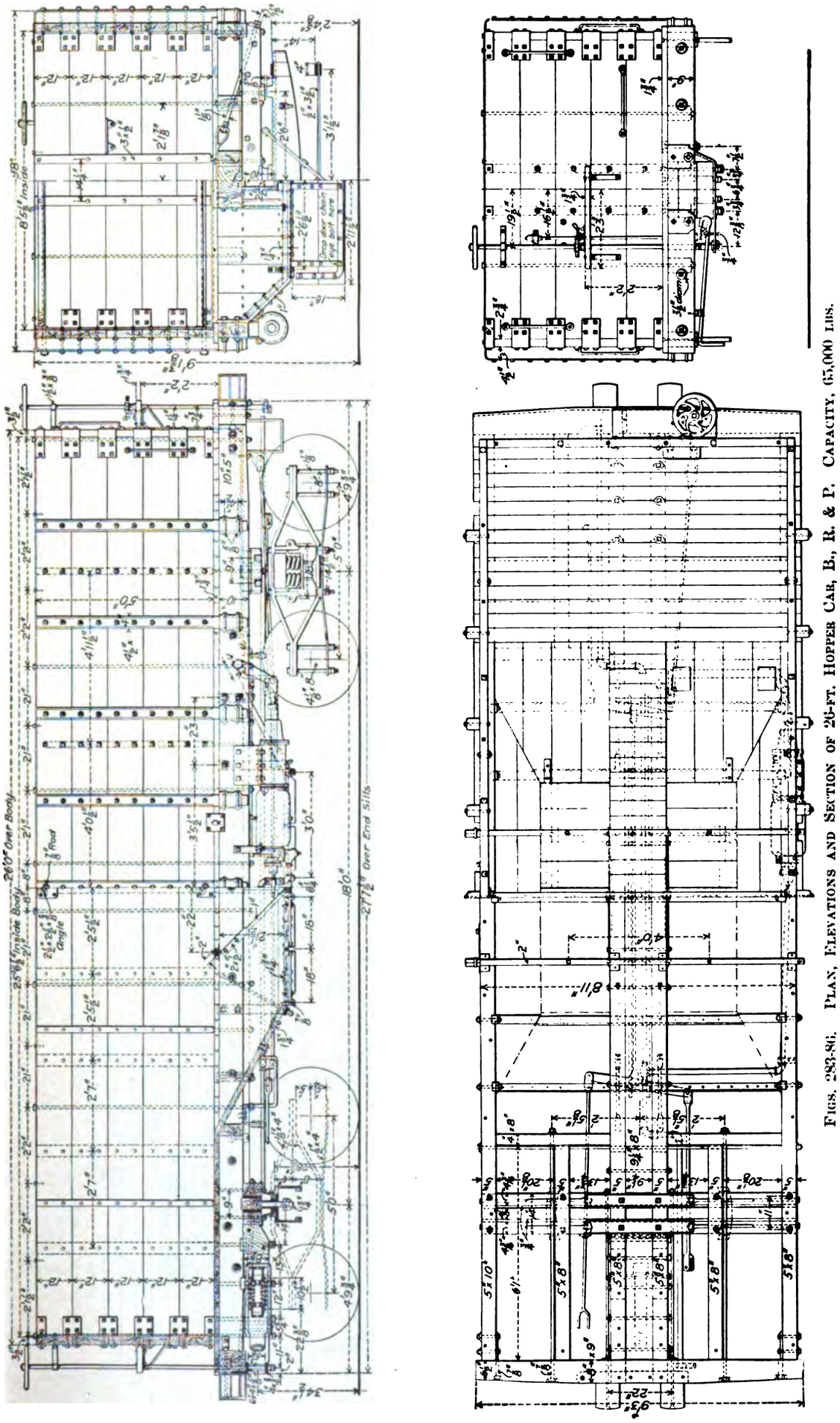
NUMBERS REFER TO LIST OF NAMES WITH FIGS. 268-70.



FIGS. 275-78. PLAN, ELEVATION AND SECTIONS OF 36-FT. 6-IN. TWIN HOPPER GONDOLA CAR. PRESSED STEEL. CAPACITY, 95,000 LBS.

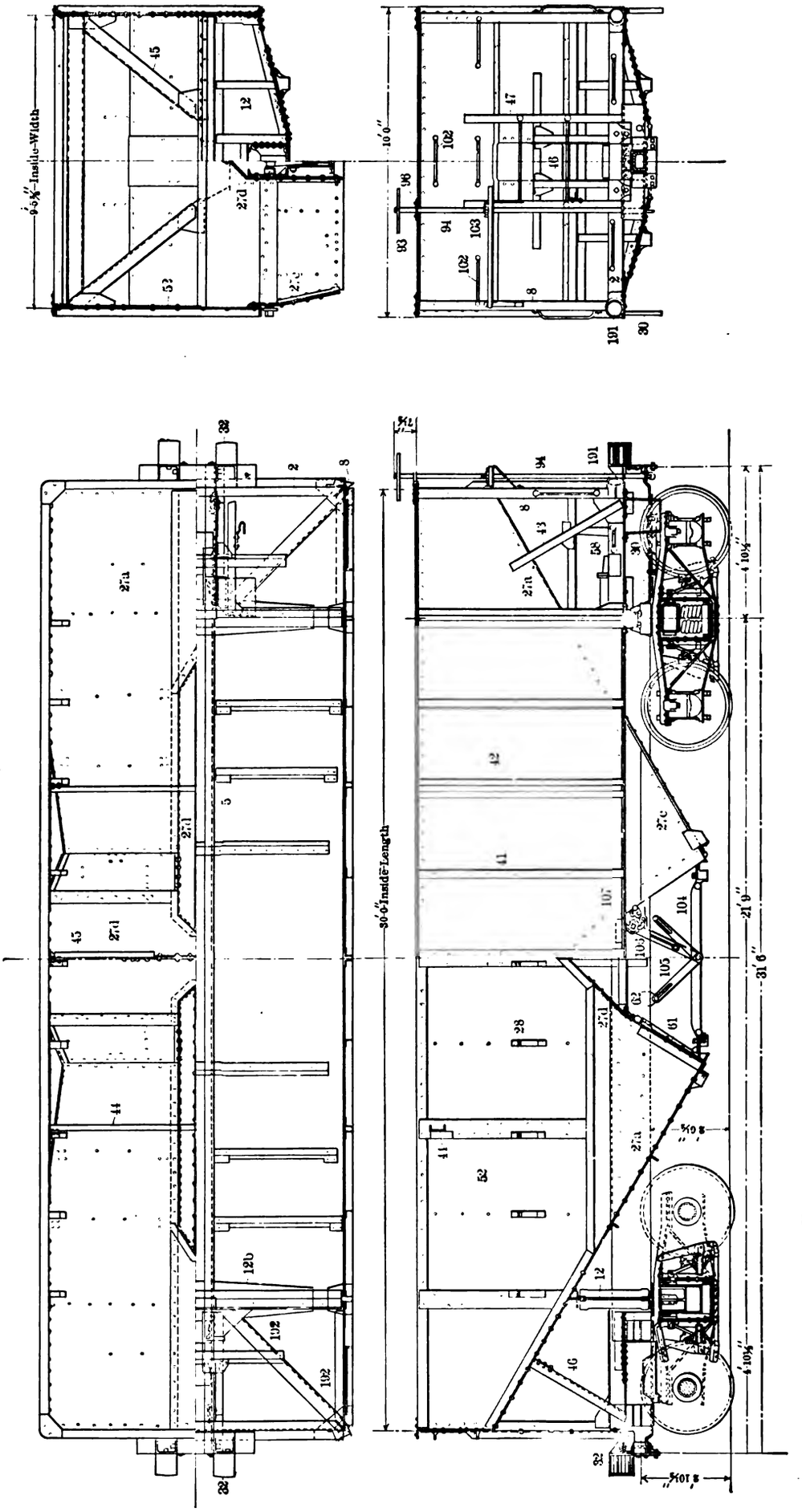


FIGS. 279-282. PLAN, ELEVATIONS AND SECTIONS OF 34-FT. STERLINGWORTH HOPPER BOTTOM GONDOLA CAR. STRUCTURAL STEEL. CAPACITY, 80,000 LBS.



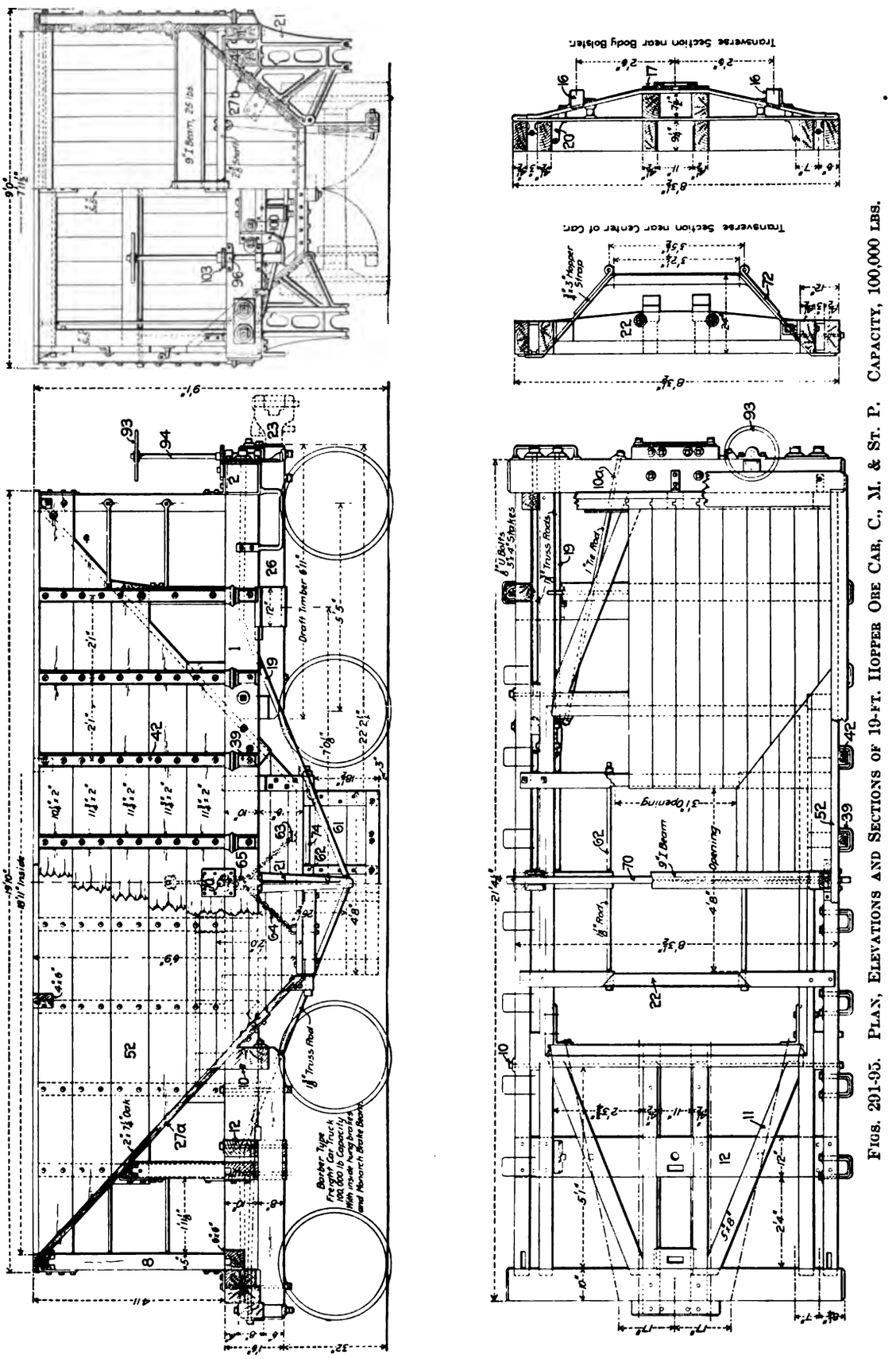
FIGS. 283-86. PLAN, ELEVATIONS AND SECTION OF 26-FT. HOPPER CAR, B., R. & P. CAPACITY, 65,000 LBS.

NUMBERS REFER TO LIST OF NAMES WITH FIGS. 268-270.

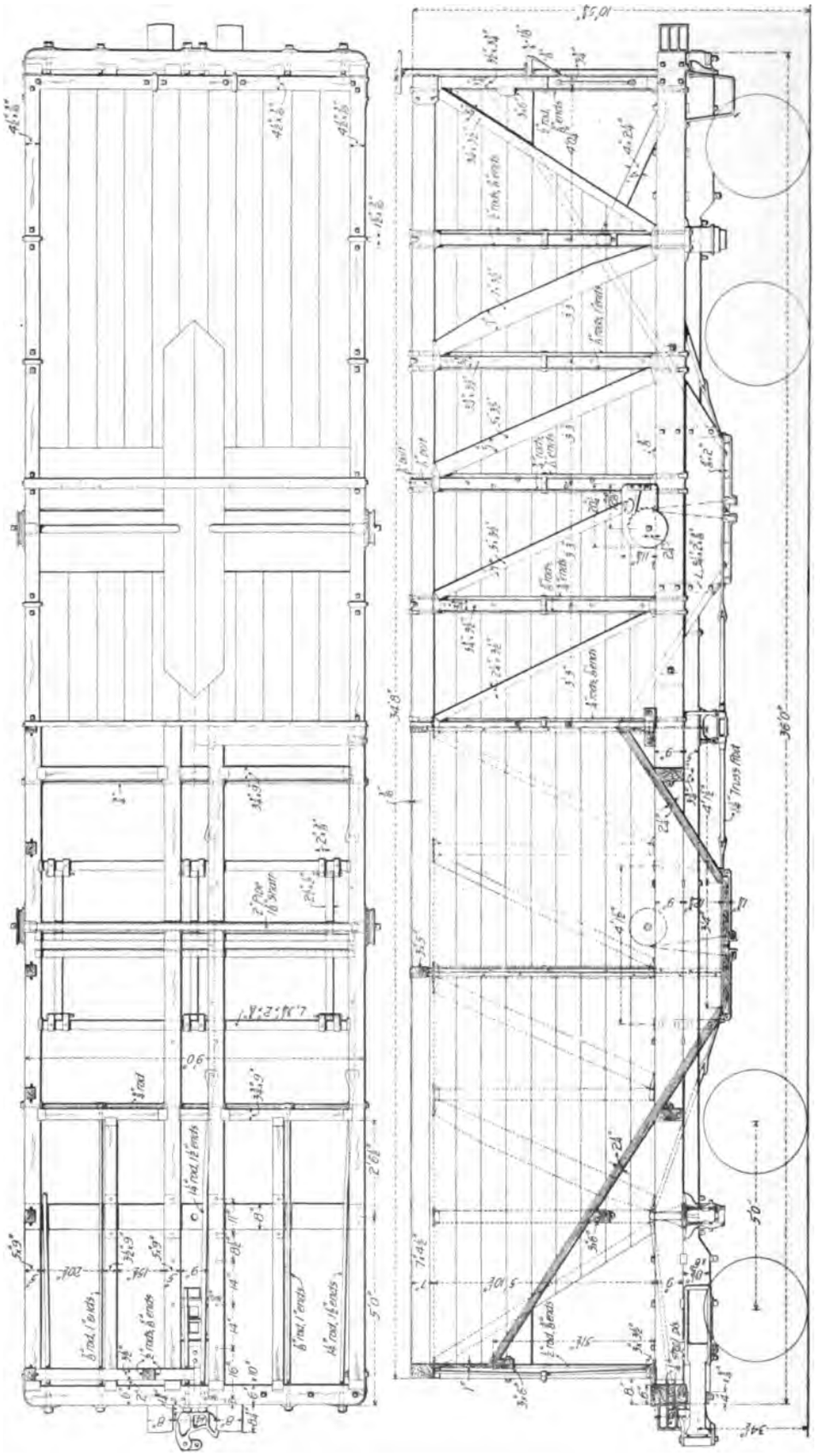


FIGS. 287-290. PLAN, ELEVATIONS AND SECTIONS OF 30-FT. HOPPER CAR. PRESSED STEEL. CAPACITY, 100,000 LBS.

NUMBERS REFER TO LIST OF NAMES WITH FIGS. 268-70.



FIGS. 291-95. PLAN, ELEVATIONS AND SECTIONS OF 19-FT. HOPPER ORE CAR, C, M. & ST. P. CAPACITY, 100,000 LBS.



FIGS. 296-97. PLAN AND ELEVATION OF 34-FT. CANDA HOPPER CAR. CAPACITY, 100,000 LBS.

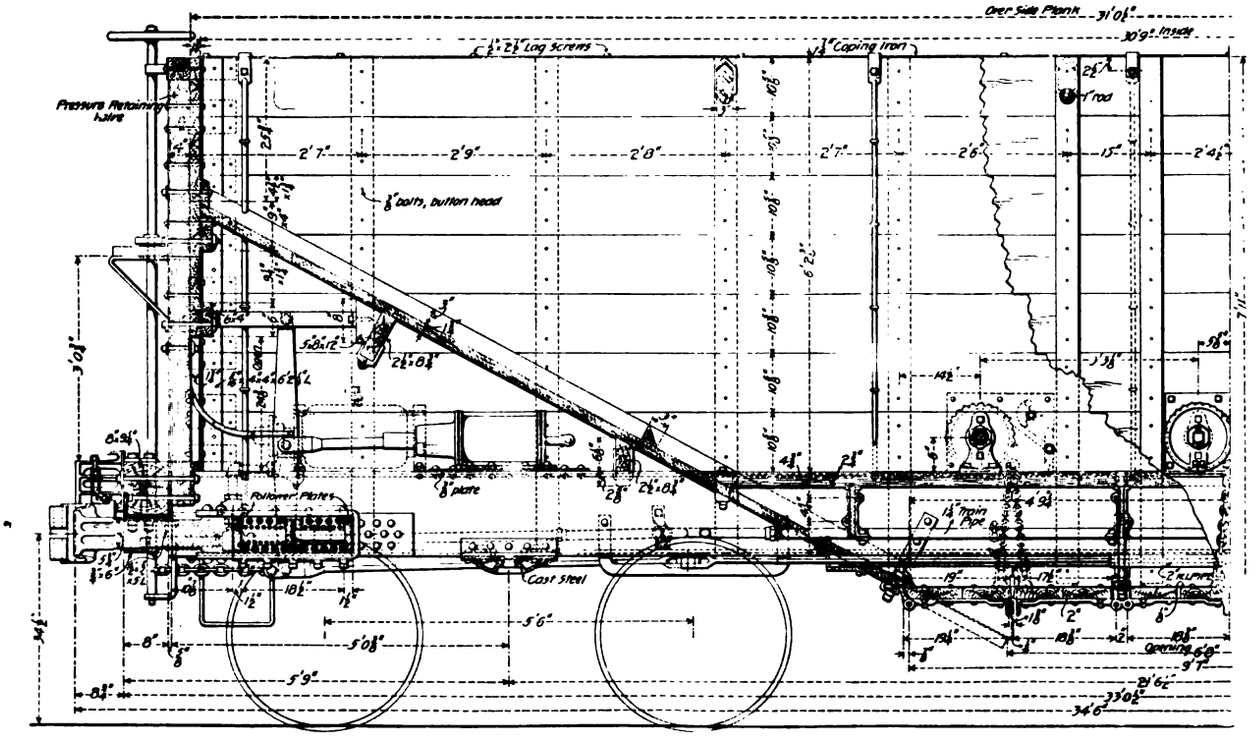


FIG. 298. HALF SECTION OF 31-FT. HOPPER CAR WITH STRUCTURAL STEEL UNDERFRAME, N. & W. CAPACITY, 100,000 LBS.

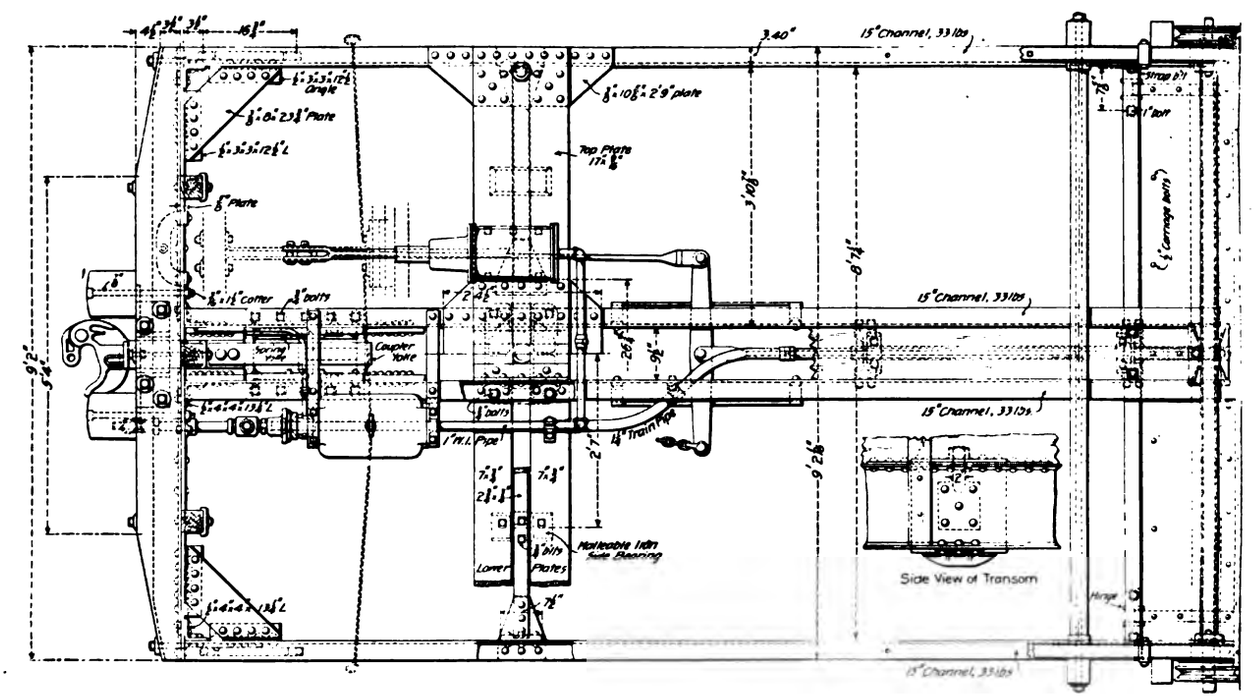
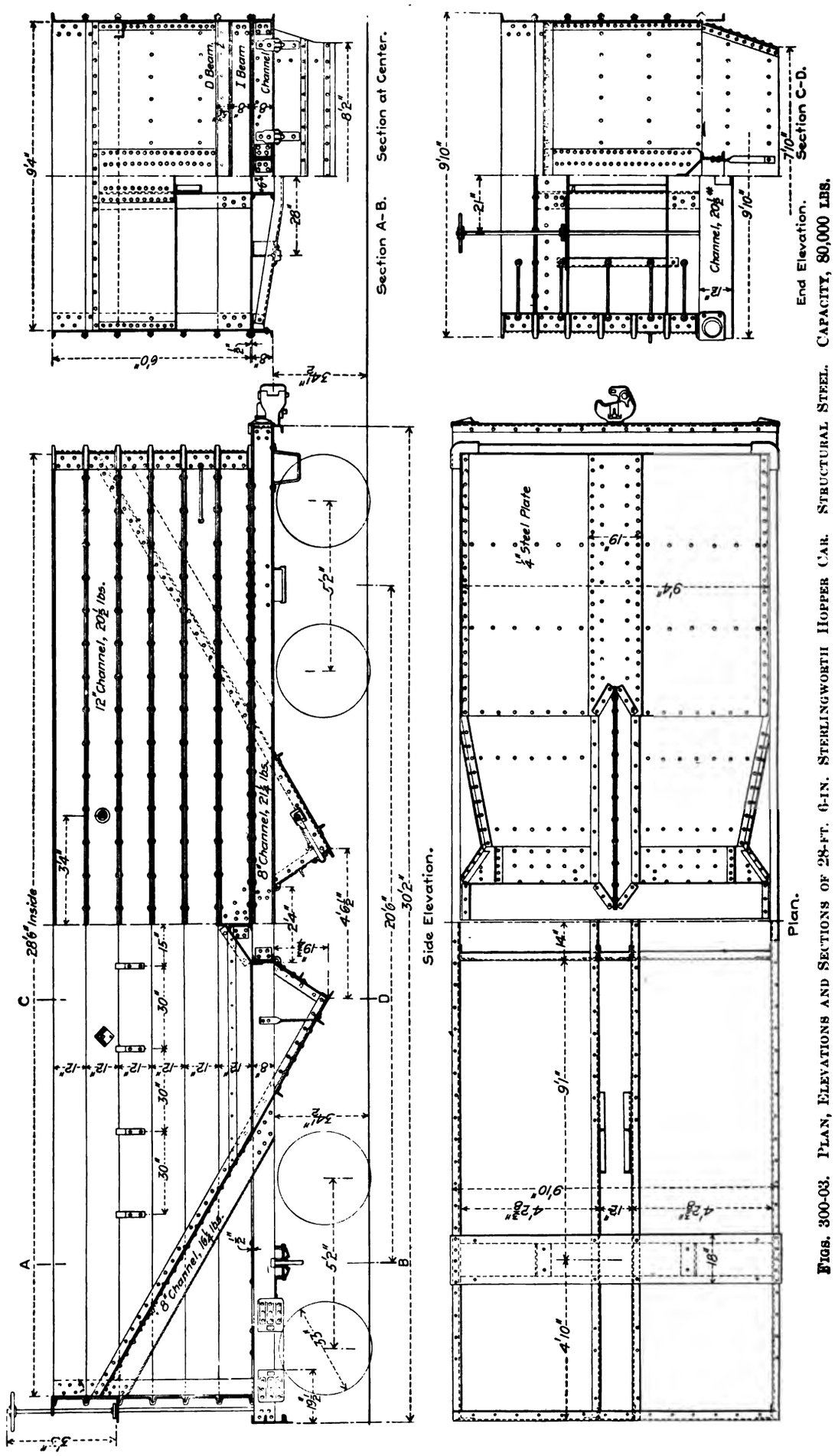
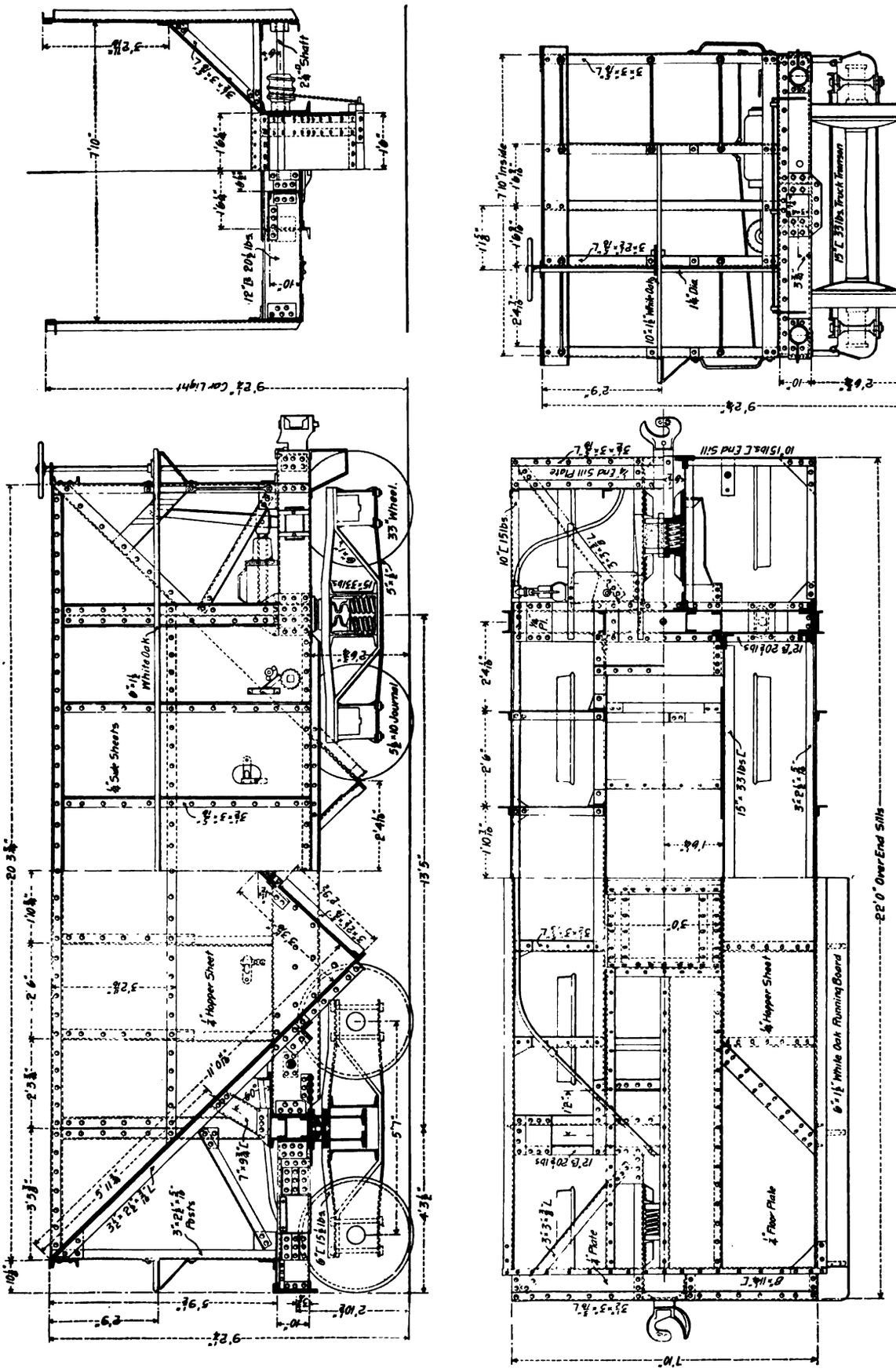


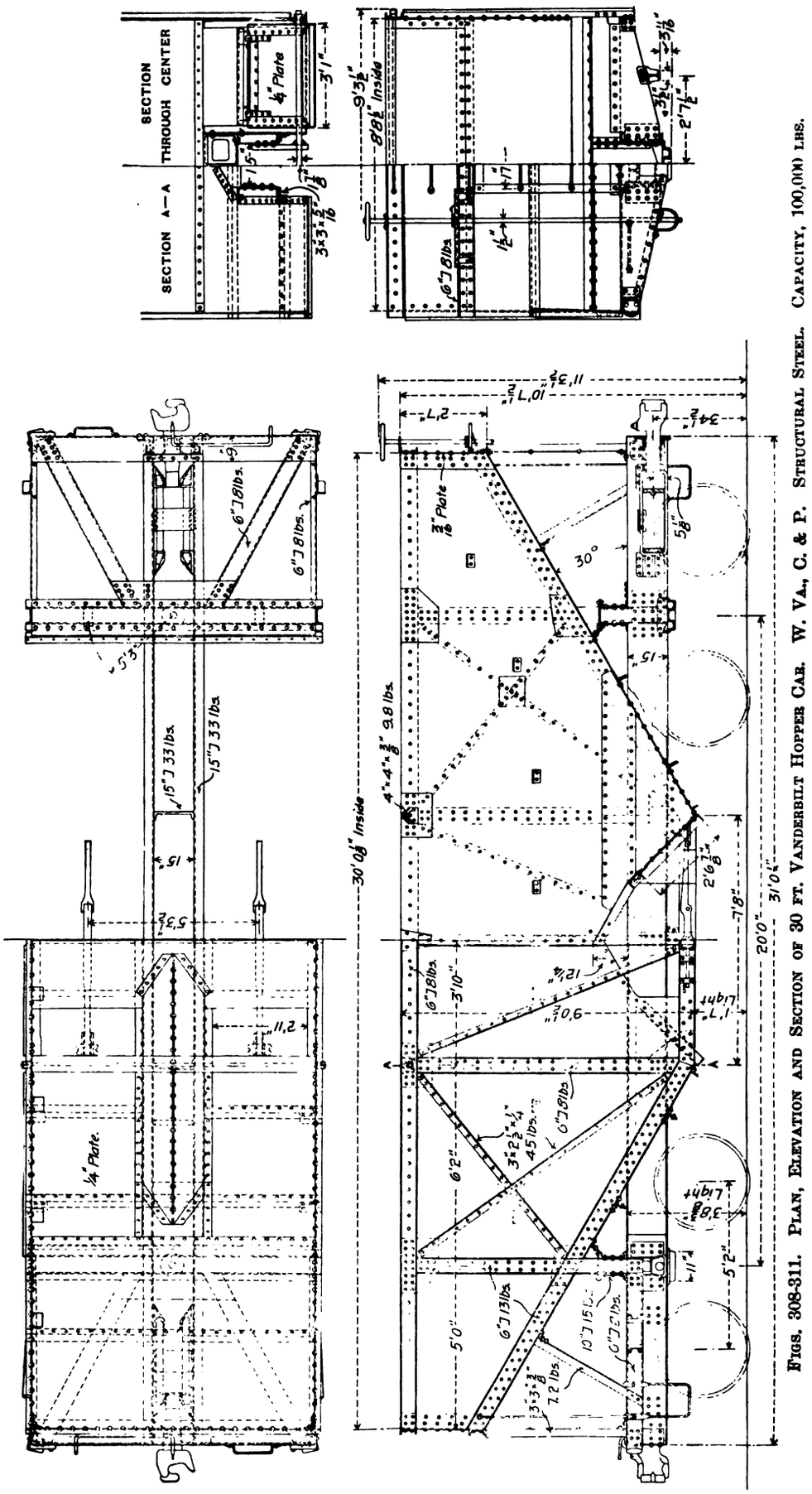
FIG. 299. PLAN OF FRAMING OF 31-FT. HOPPER CAR WITH STRUCTURAL STEEL UNDERFRAME, N. & W. CAPACITY, 100,000 LBS.



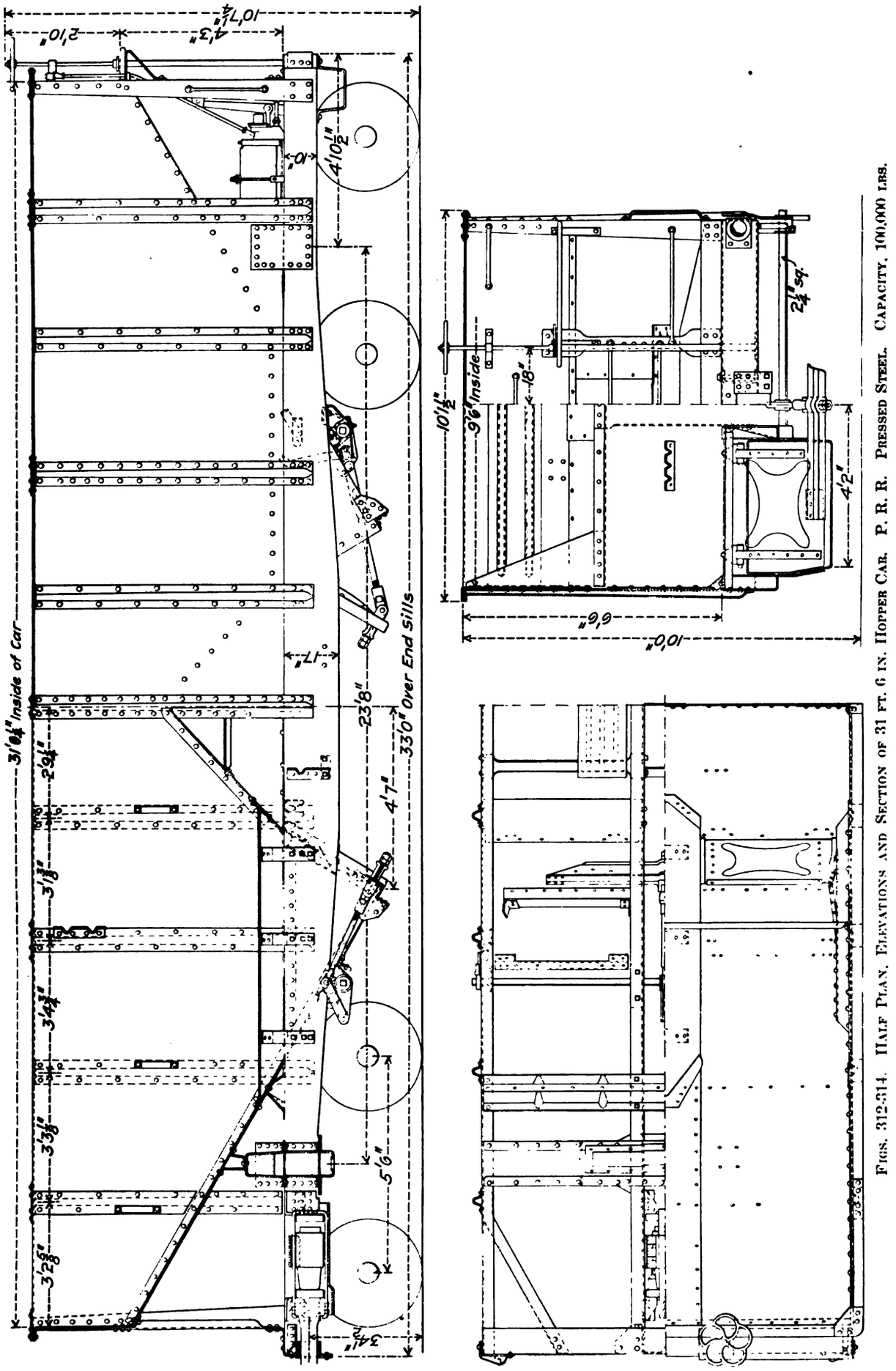
FIGS. 300-03. PLAN, ELEVATIONS AND SECTIONS OF 28-FT. 6-IN. STERLINGWORTH HOPPER CAR. STRUCTURAL STEEL. CAPACITY, 80,000 LBS.



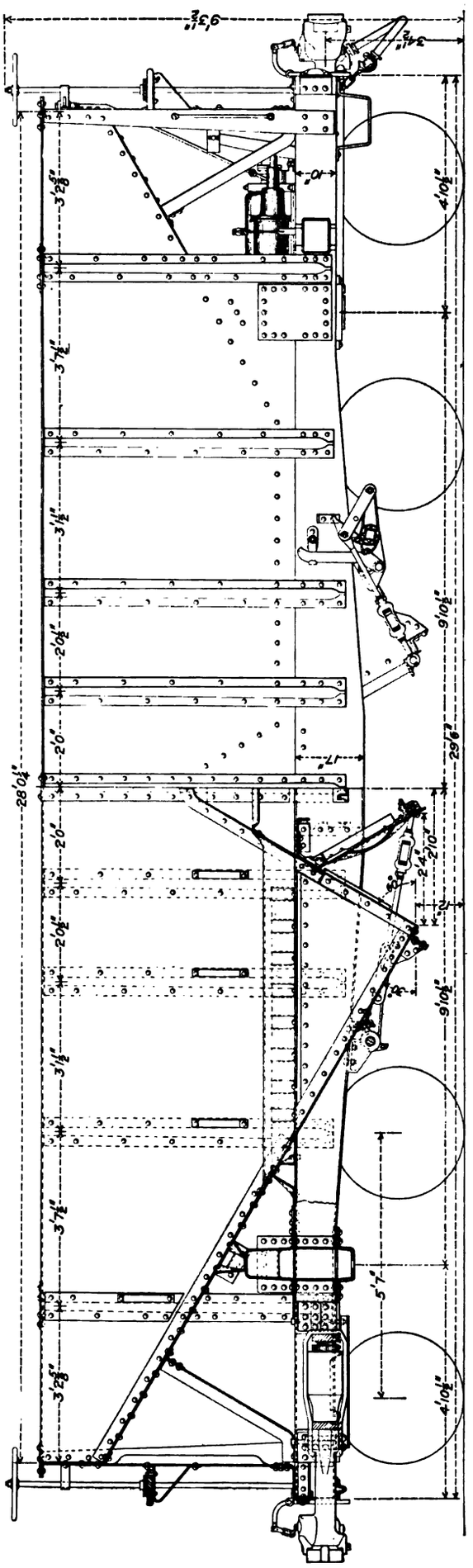
FIGS. 304-307. PLAN, ELEVATIONS AND SECTIONS OF 20-FT. HOPPER ORE CAR, G. N. R. R. STRUCTURAL STEEL. CAPACITY, 100,000 LBS.

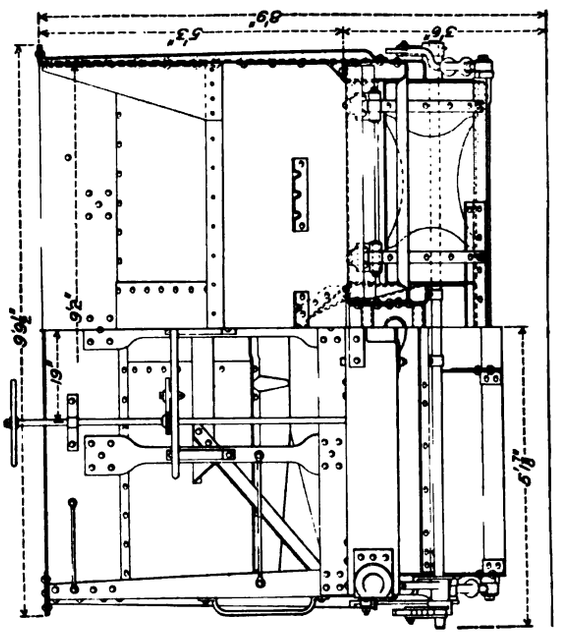


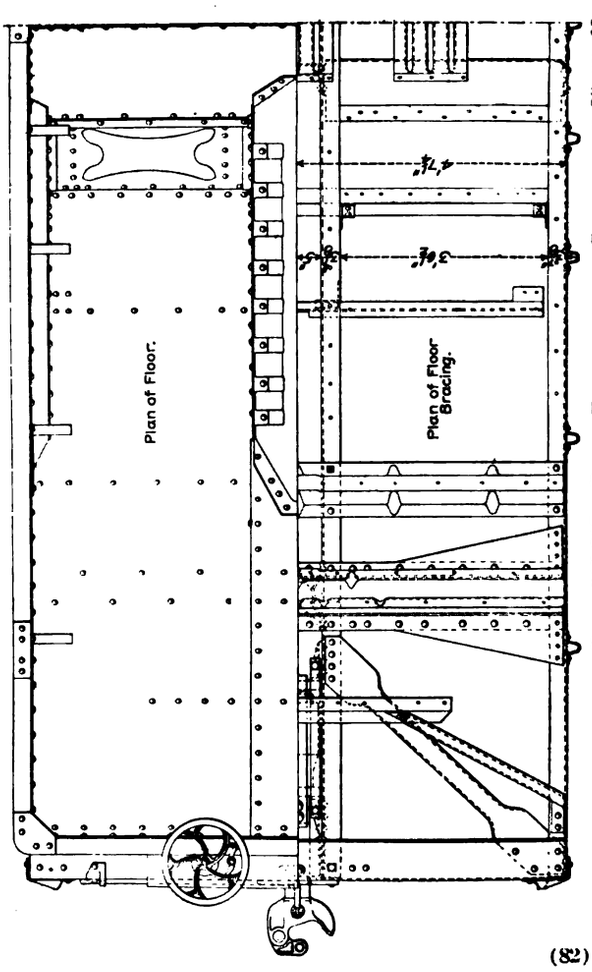
FIGS. 308-311. PLAN, ELEVATION AND SECTION OF 30 FT. VANDERBILT HOPPER CAR. W. VA., C. & P. STRUCTURAL STEEL. CAPACITY, 100,000 LBS.



Figs. 312-314. Half Plan, Elevations and Section of 31 ft. 6 in. Hopper Car. P. R. R. Pressed Steel. Capacity, 100,000 lbs.







FIGS. 315-317. PLAN, ELEVATION AND SECTIONS OF 28 FT. HOPPER CAR. B. & L. E. PRESSED STEEL. CAPACITY, 100,000 LBS.

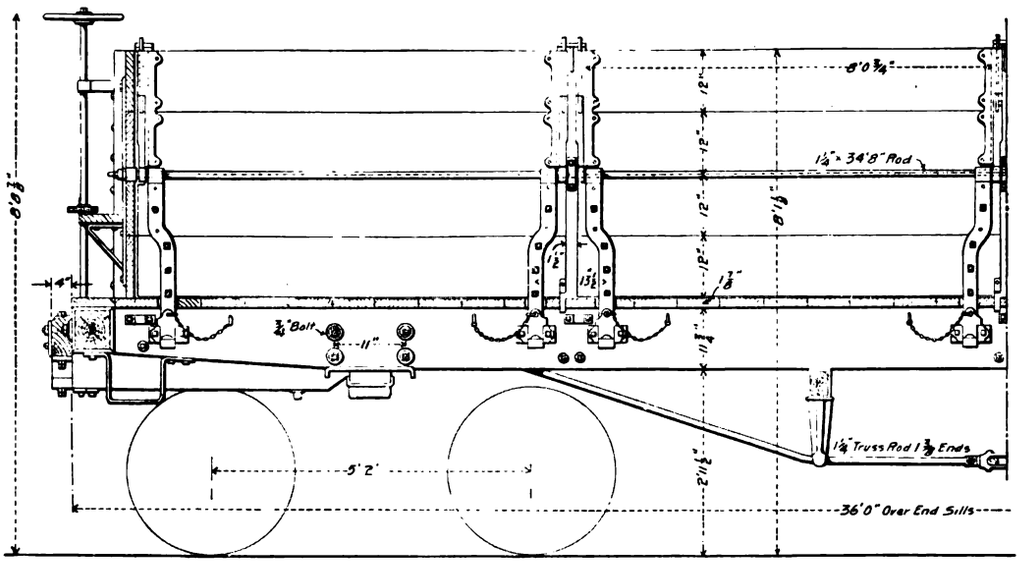


FIG. 318. SIDE ELEVATION.

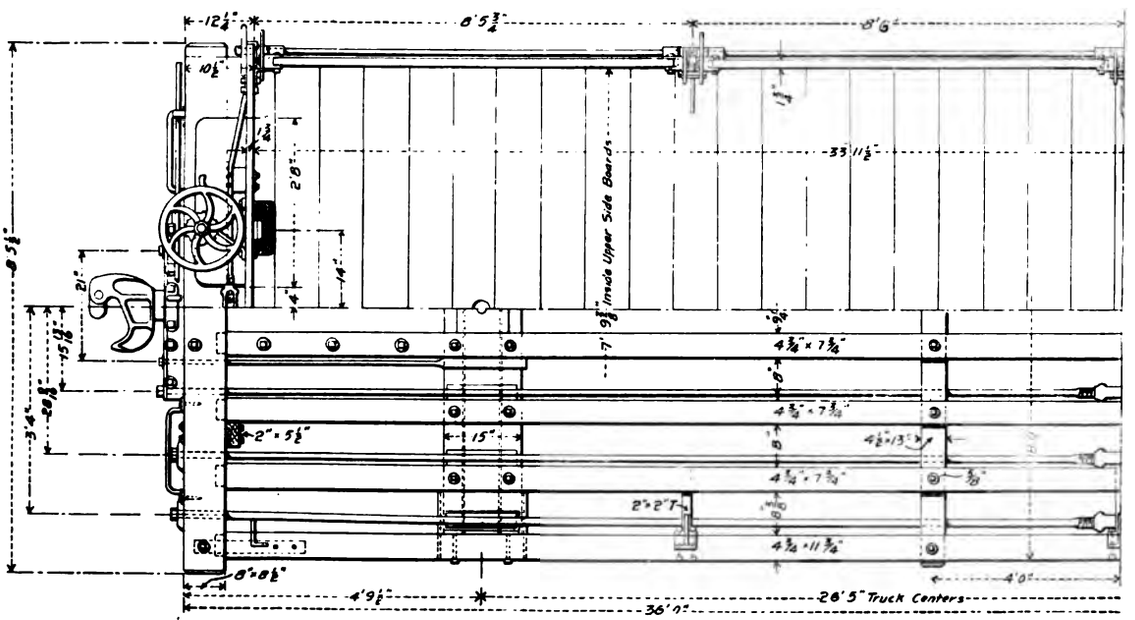


FIG. 319. HALF PLAN AND UNDERFRAMING.

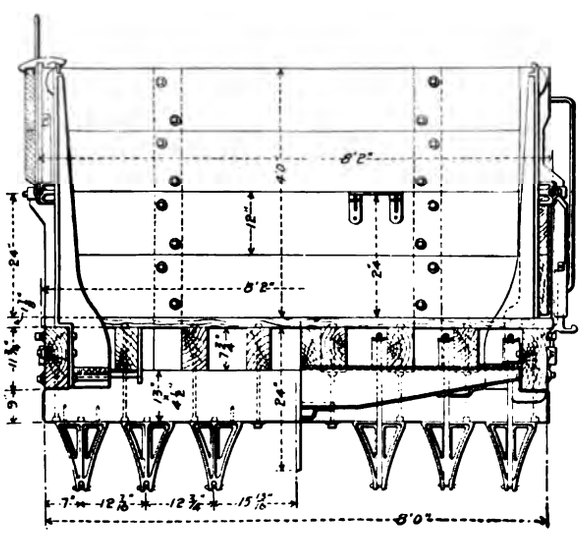


FIG. 320. HALF SECTION AT BOLSTER AND NEEDLEBEAM.

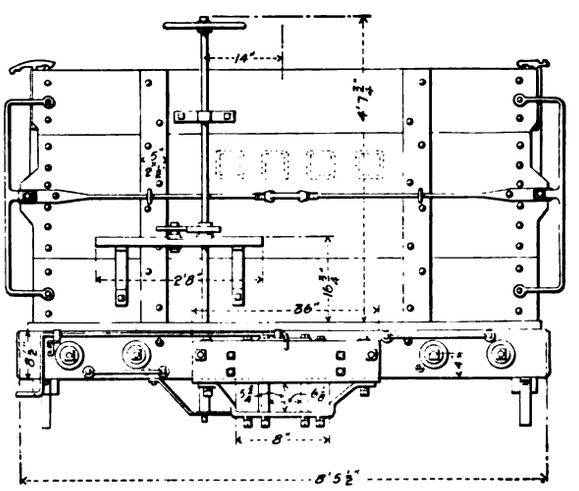


FIG. 321. END ELEVATION.

36 FT. PRATT COAL CAR. N. Y., N. H. & H. CAPACITY, 60,000 LBS.

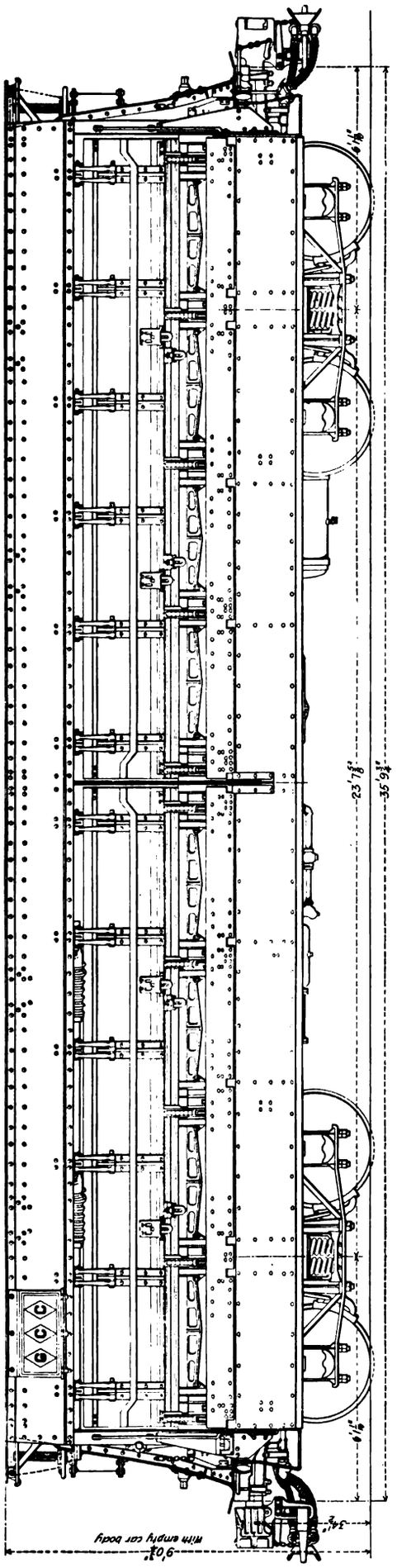


FIG. 322. SIDE ELEVATION.

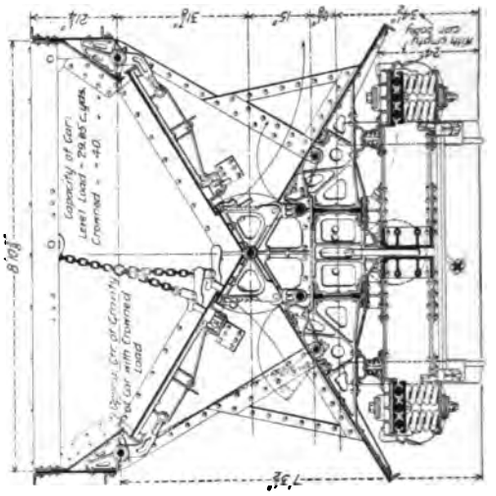


FIG. 324. SECTION.

FIGS. 322-324. GOODWIN DUMP CAR.
STRUCTURAL STEEL. CAPACITY, 80,000 LB.

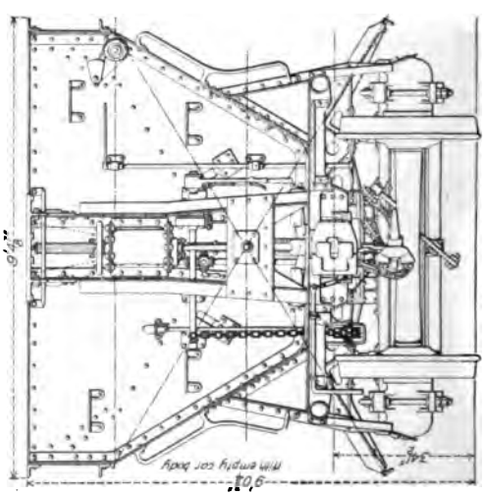
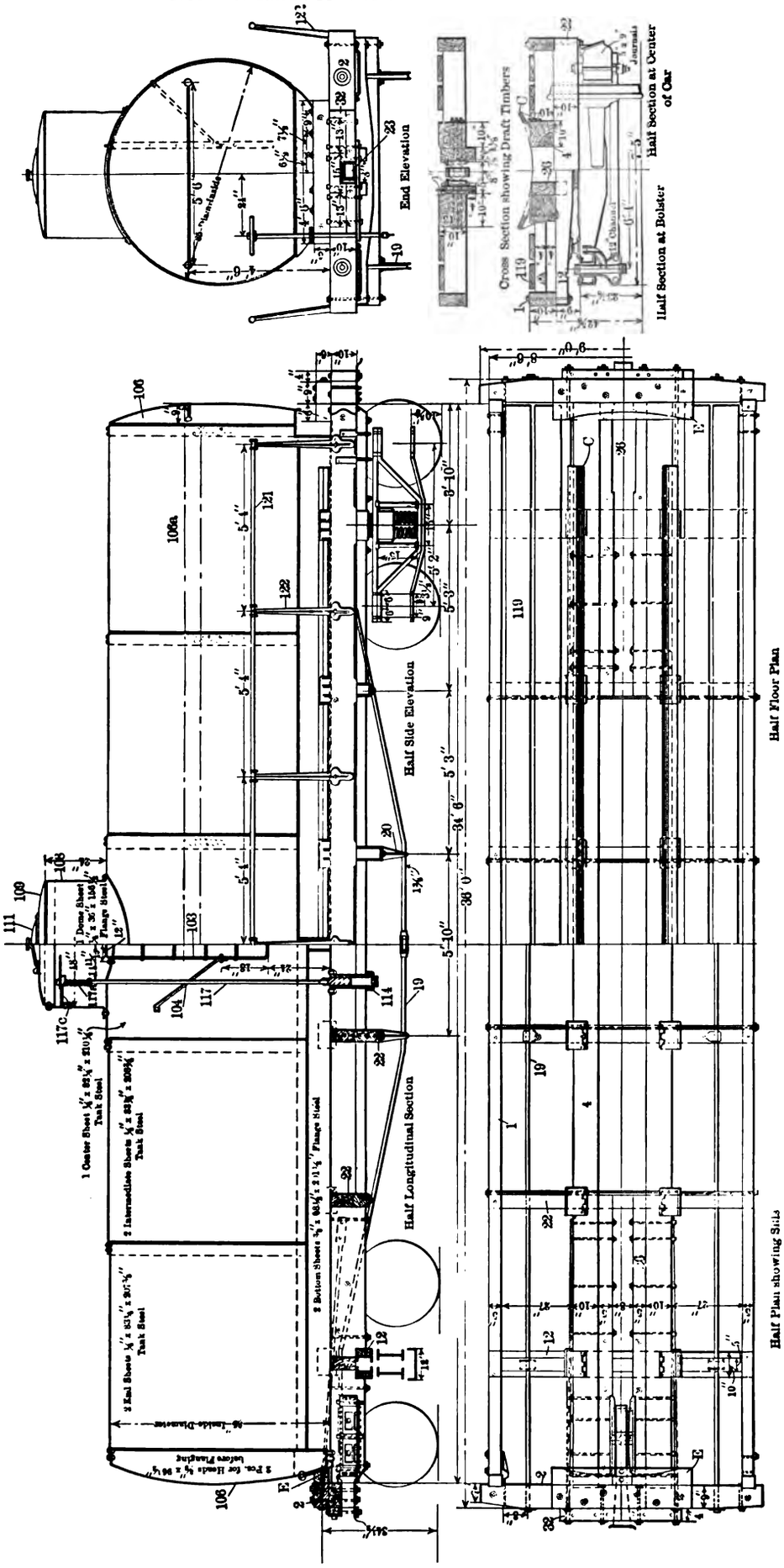


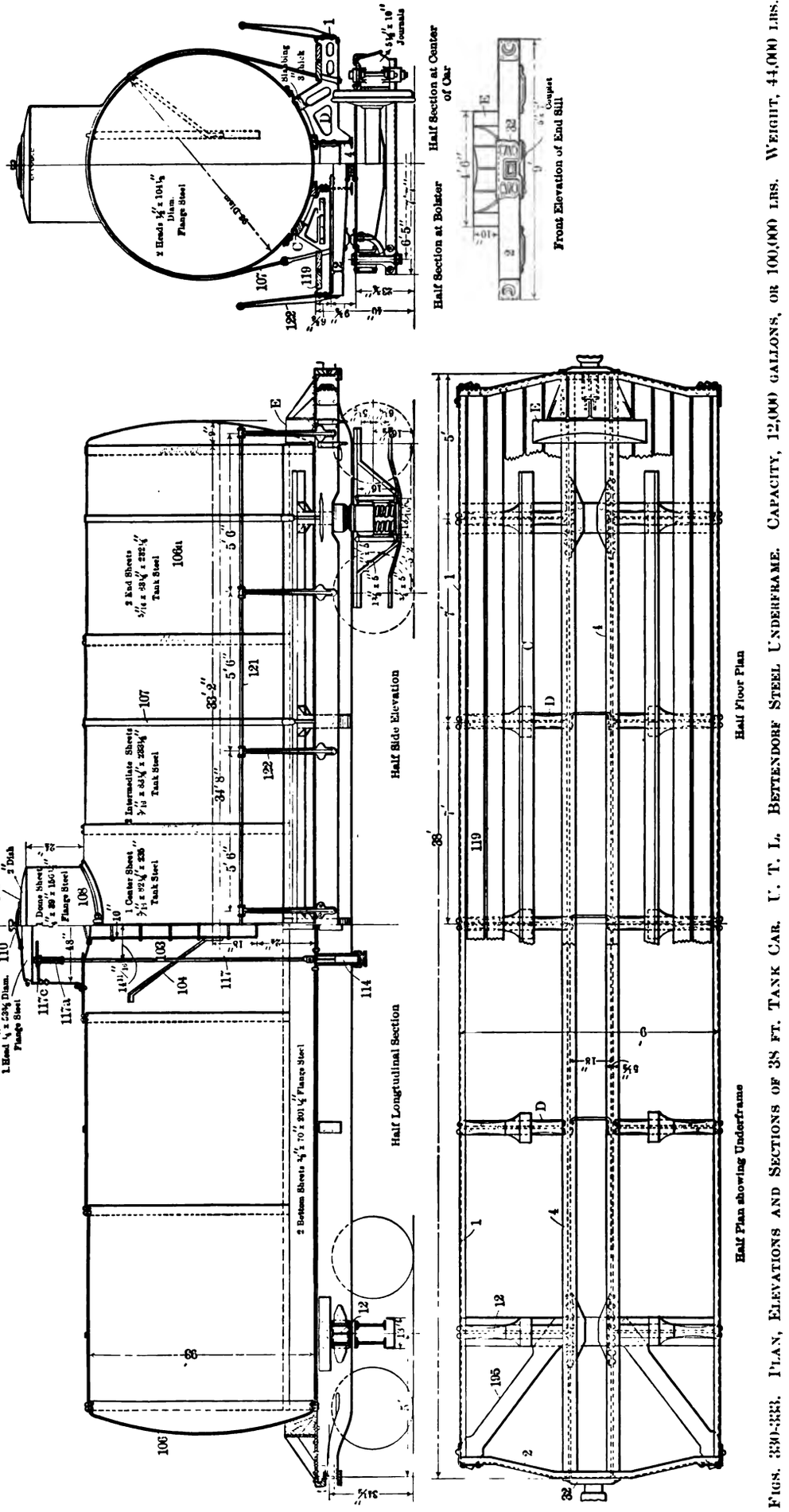
FIG. 323. END ELEVATION.

NUMBERS REFER TO LIST OF NAMES WITH FIGS. 340-342.



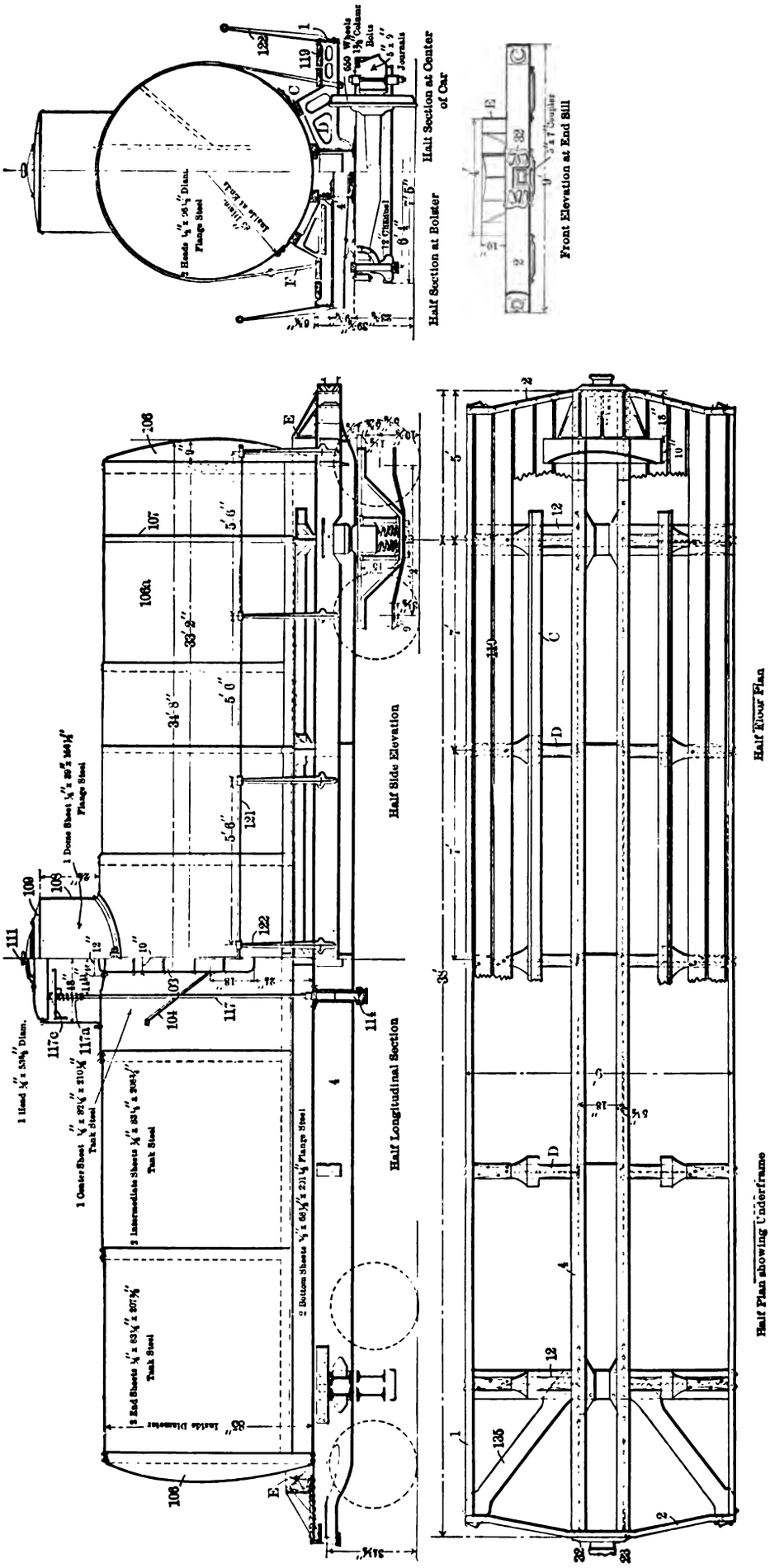
FIGS. 325-329. PLAN, ELEVATIONS AND SECTIONS OF 36 FT. TANK CAR. U. T. L. CAPACITY, 10,000 GALLONS, OR 70,000 LBS. WEIGHT, 38,000 LBS.

NUMBERS REFER TO LIST OF NAMES WITH FIGS. 340-342.

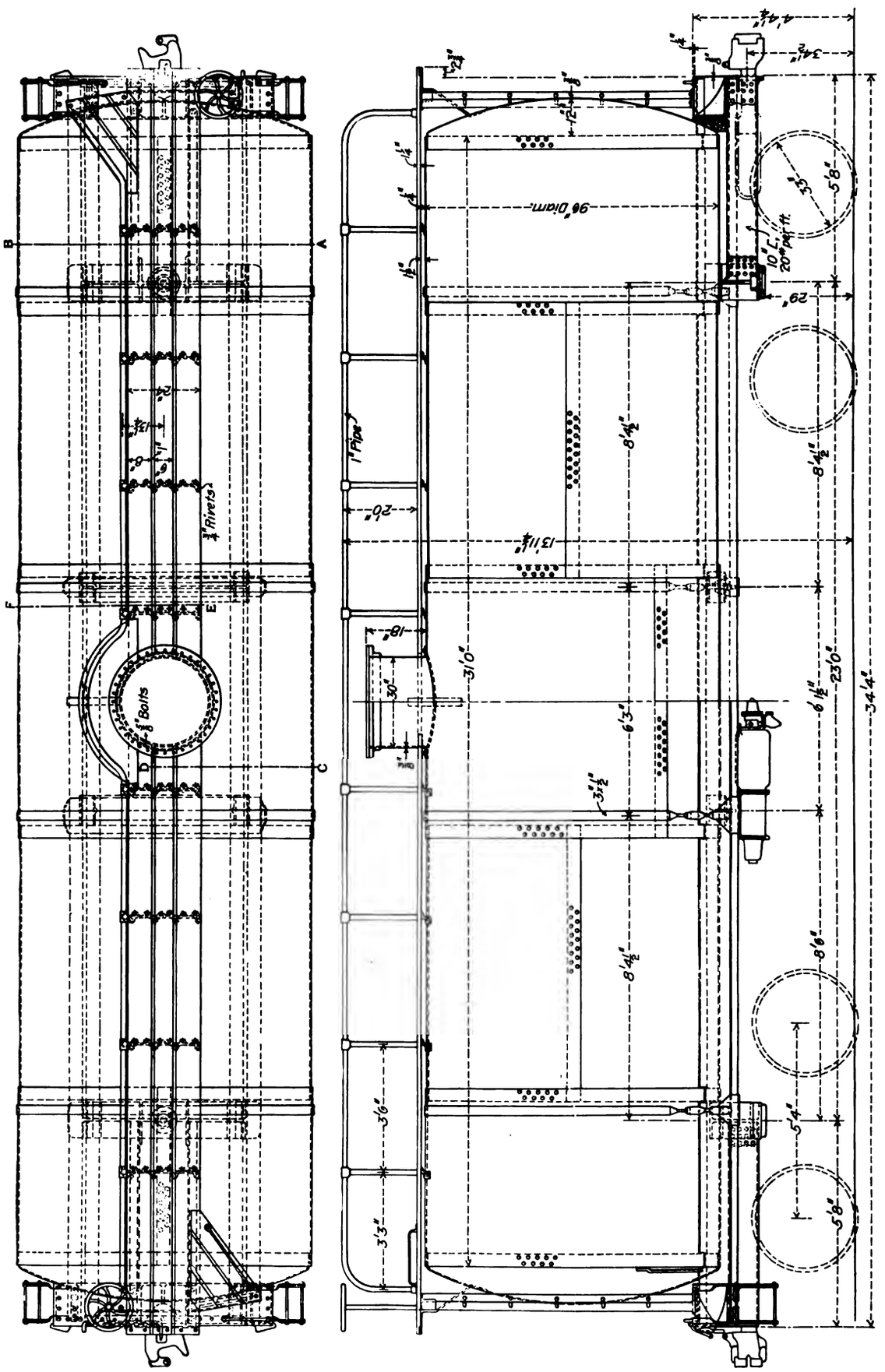

Half Section at Center of Car
Half Section at Bolster
Front Elevation of End Sill
Half Side Elevation
Half Longitudinal Section
Half Floor Plan
Half Plan showing Underframe

FIGS. 330-333. PLAN, ELEVATIONS AND SECTIONS OF 38 FT. TANK CAR. U. T. L. BETTENDORF STEEL UNDERFRAME. CAPACITY, 12,000 GALLONS, OR 100,000 LBS. WEIGHT, 44,000 LBS.

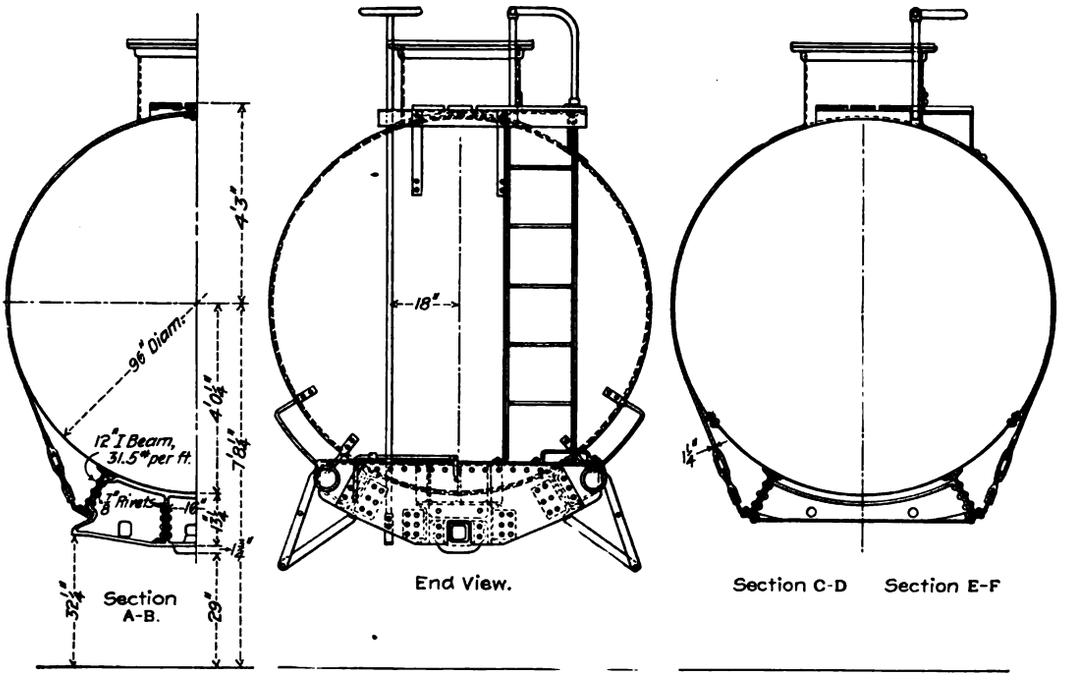
NUMBERS REFER TO LIST OF NAMES WITH FIGS. 340-342


Half Section at Bolster
Half Section at Center of Car
Front Elevation at End Sill
Half Side Elevation
Half Longitudinal Section
Half Floor Plan
Half Plan showing Underframe

FIGS. 334-337. PLAN, ELEVATIONS AND SECTIONS OF 38 FT. TANK CAR. U. T. L. BETTENDORF STEEL UNDERFRAME. CAPACITY, 10,000 GALLONS, OR 70,000 LBS. WEIGHT, 40,000 LBS.



FIGS. 338-339. PLAN AND ELEVATION OF 34 FT. VANDERBILT TANK CAR. CAPACITY, 12,000 GALLONS, OR 100,000 LBS.



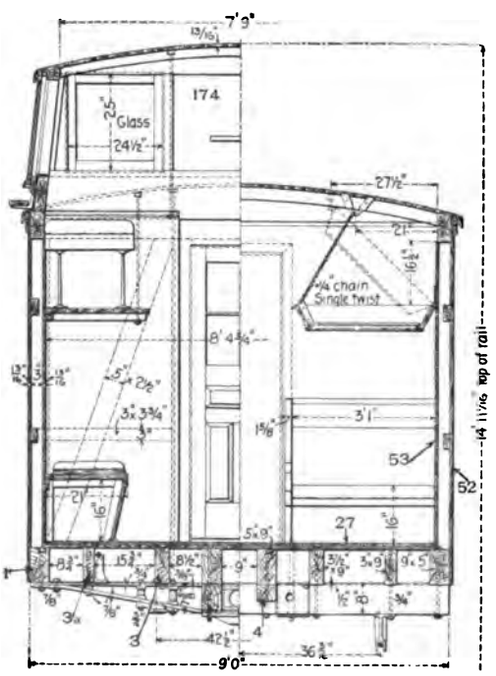
FIGS. 340-342. END ELEVATION AND SECTIONS OF 34 FT. VANDERBILT TANK CAR. CAPACITY, 12,000 GALLONS, OR 100,000 LBS.

NAMES OF PARTS OF TANK CAR. FIGS. 325-337.

1. *Sill*
2. *End Sill*
4. *Center Sill*
12. *Body Bolster*
19. *Body Truss Rod*
20. *Body Truss Rod Bearing*
22. *Cross Tie Timber*
23. *Draw Bar*
26. *Draw Timbers*
30. *Sill Step*
32. *Dead Blocks*
32a. *Buffer Beam*
102. *Grab Iron or Hand Hold*
106. *Tank, for Tank Car*
106'. *Tank Head*
107. *Tank Band*
108. *Tank Dome*
109. *Dome Head*
110. *Man Hole*
111. *Man Hole Cover*
112. *Safety Valve*
113. *Man Hole Cover Hinge*
114. *Tank Valve*
115. *Tank Valve Seat or Tank Nozzle*
117. *Tank Valve Rod*
117a. *Tank Valve Rod Screw*
117b. *Tank Valve Rod Lever*
117c. *Tank Valve Rod Bracket*
118. *Tank Nozzle Cap*
119. *Running Board*
121. *Hand Rail*
122. *Hand Rail Post*
B. *Upper and Lower Filling Strips*
C. *Tank Slabbing*
D. *Tank Saddles*
E. *Tank Head Block*
F. *Tank Band Tie Rod*

NAMES OF PARTS OF CABOOSE CARS. FIGS. 343-348.

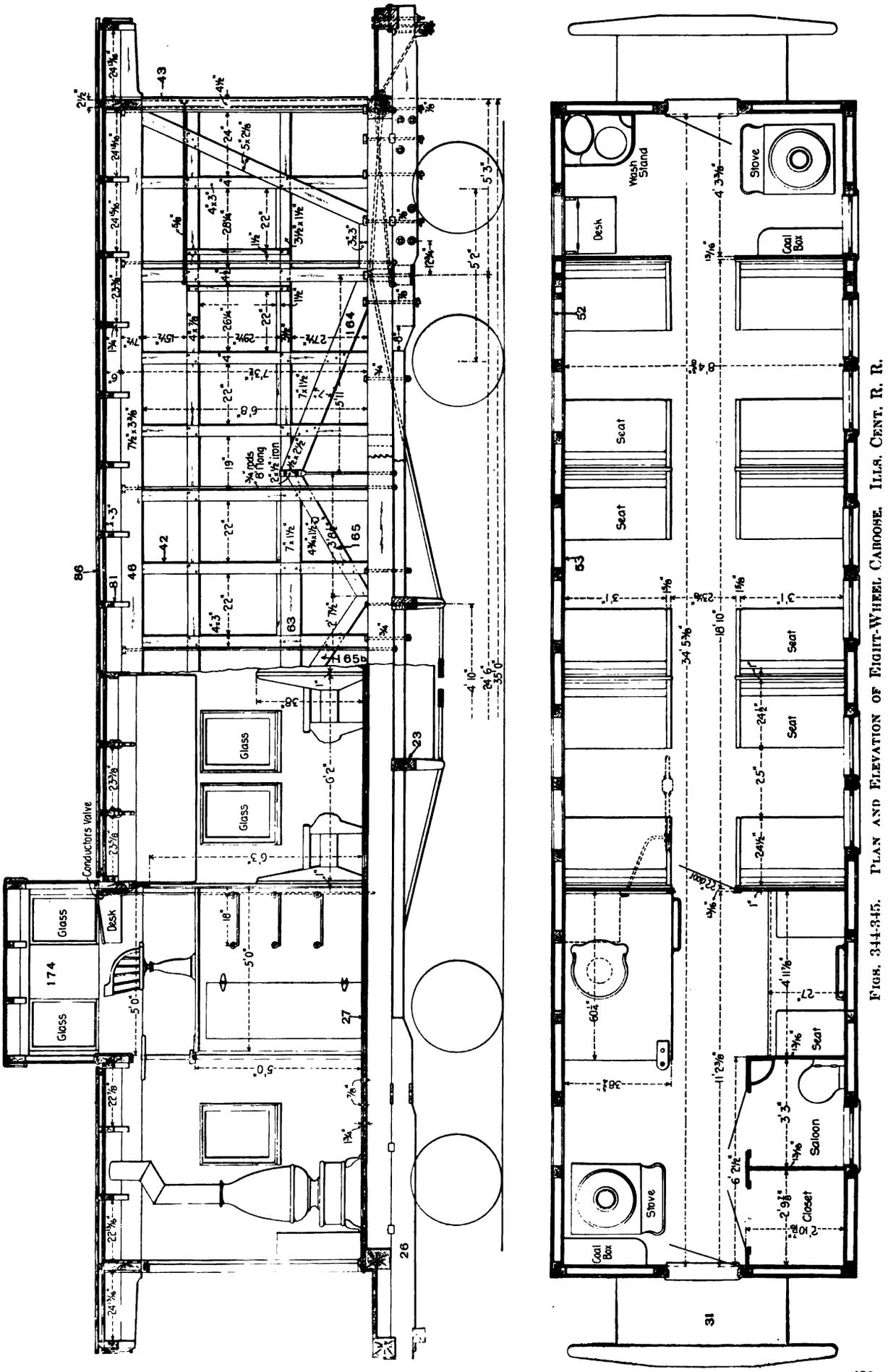
1. *Side Sill*
3. *Intermediate Sill*
3a. *Outer Intermediate Sill*
4. *Center Sill*
10. *Body Bolster*
19. *Body Truss Rod*
23. *Cross Tie Timber*
26. *Draft Timber*
27. *Floor*
30. *Platform Step*
31. *Platform*
37. *Brace*
42. *Post*
43. *Corner Post*
46. *Plate*



52. *Sheathing*
53. *Lining*
63. *Truss Plank*
64. *Door Sill*
81. *Carline*
86. *Roof*
102. *Hand Hold*
141. *Signal Lamp Bracket*
141a. *Lookout Signal Lamp*
164. *Compression Beam Brace*
165. *Counter Brace*
165b. *Auxiliary Compression Beam Brace*
174. *Lookout*

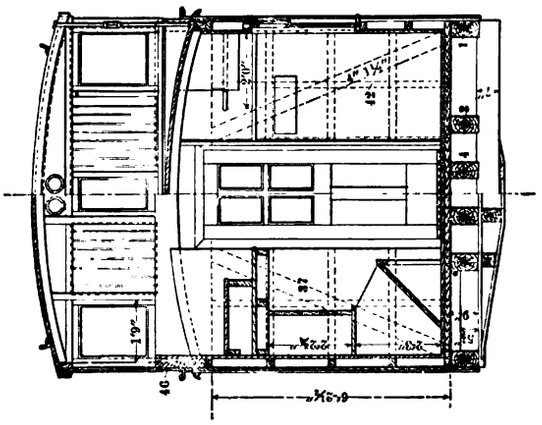
FIG. 343. CROSS SECTION OF EIGHT-WHEEL CABOOSE. ILLS. CENT. R. R.

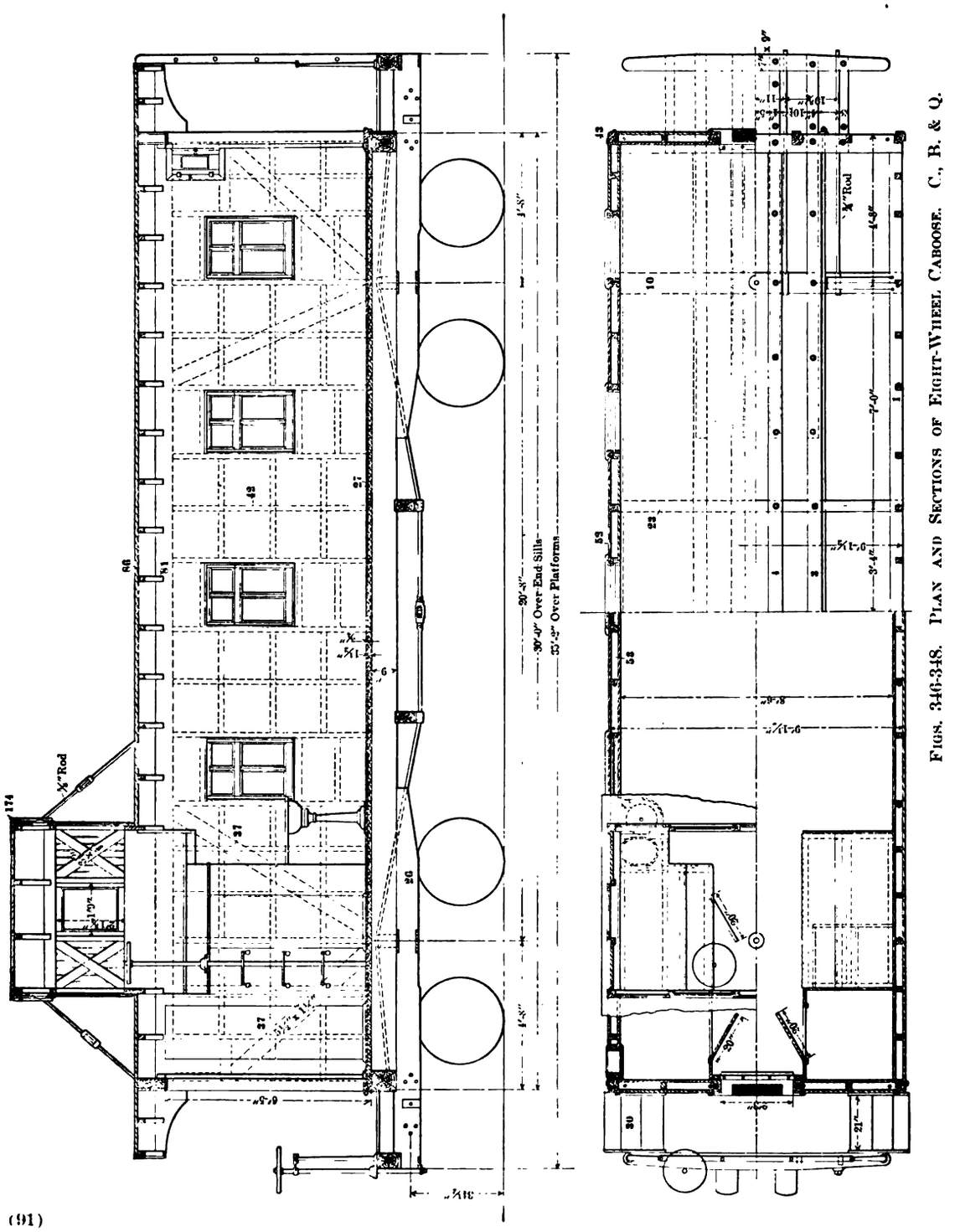
NUMBERS REFER TO LIST OF NAMES WITH FIGS. 340-343.



FIGS. 344-345. PLAN AND ELEVATION OF EIGHT-WHEEL CABOOSE. ILLS. CENT. R. R.

NUMBERS REFER TO LIST OF NAMES WITH FIGS. 340-343.



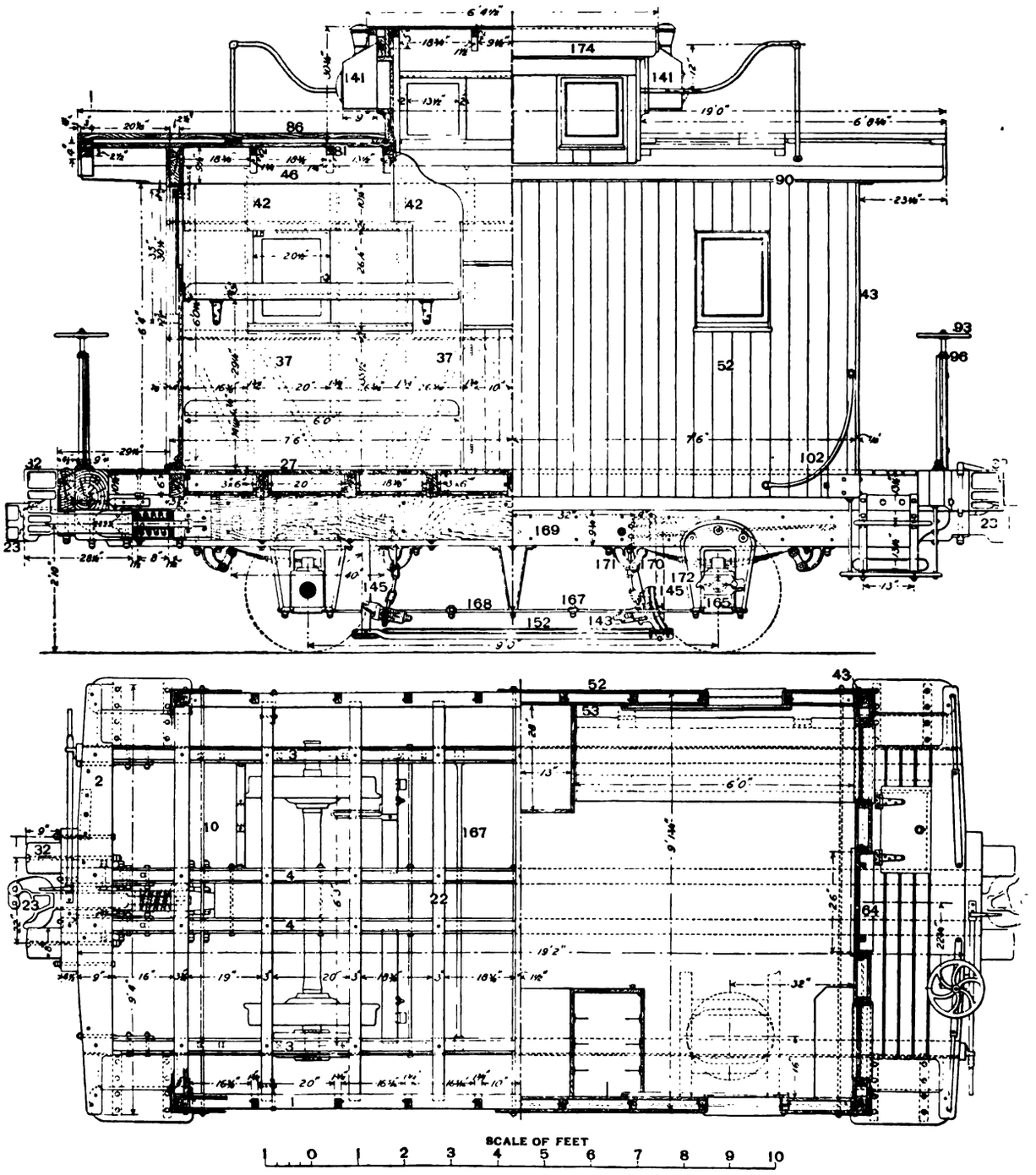


FIGS. 346-348. PLAN AND SECTIONS OF EIGHT-WHEEL CABOOSE. C., B. & Q.

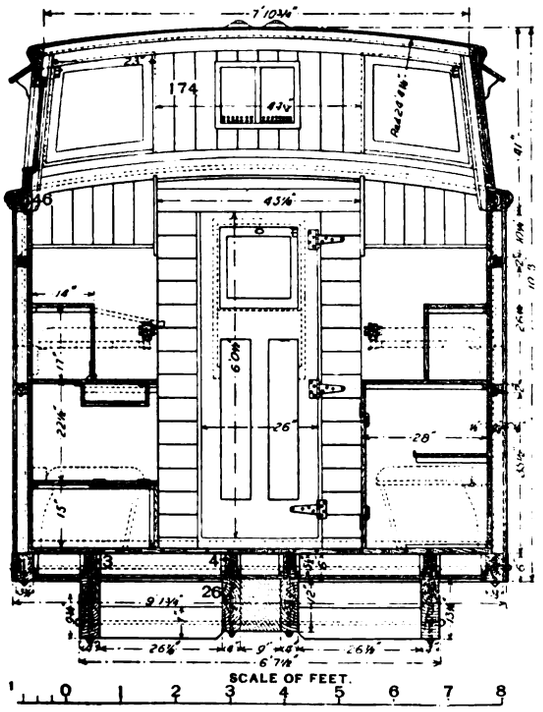
NAMES OF PARTS OF CABOOSE CARS. FIGS. 349-352.

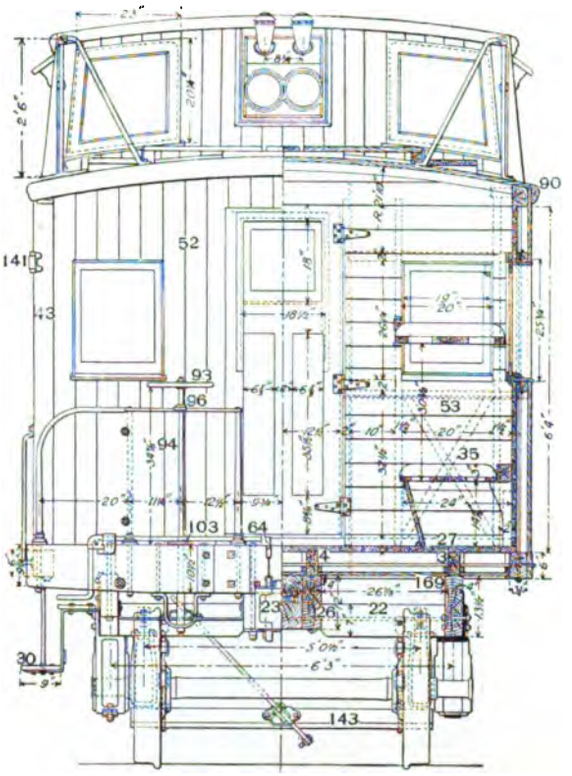
1. *Side Sill*
2. *End Sill*
3. *Intermediate Sill*
4. *Center Sill*
10. *Sill Tie Rod*
22. *Floor Timber*
23. *Draw Bar*
26. *Draft Timber*
27. *Floor*
30. *Platform Steps*
32. *Buffer Beam*
37. *Brace*
37'. *Counter Brace*
42. *Posts*
43. *Corner Post*
46. *Plate*
52. *Sheathing or Siding*
53. *Inside Lining*
64. *Door Sill*
81. *Carline*
86. *Roof Board*
90. *Eaves Fascia Board*
93. *Brake Wheel*
96. *Upper Brake Shaft Bearing*
102. *Corner Grab Iron*
103. *Brake Ratchet Wheel*
141. *Lookout Signal Lamp*
143. *Brake Beam*
145. *Brake Lever*
152. *Lower Brake Strut*
165. *Journal Box*
167. *Pedestal Stay Rod*
168. *Pedestal Tie Bar*
169. *Pedestal Timber*
170. *Spring Hanger*
171. *Spring Hanger Iron*
172. *Pedestal*
174. *Lookout*

NUMBERS REFER TO LIST OF NAMES ABOVE.



FIGS. 349-350. PLAN AND ELEVATION OF FOUR-WHEEL CABOOSE. ERIE R. R.





FIGS. 351-352. END ELEVATION AND CROSS SECTION OF FOUR-WHEEL CABOOSE. ERIE R. R.

NUMBERS REFER TO LIST OF NAMES WITH FIGS. 349-350

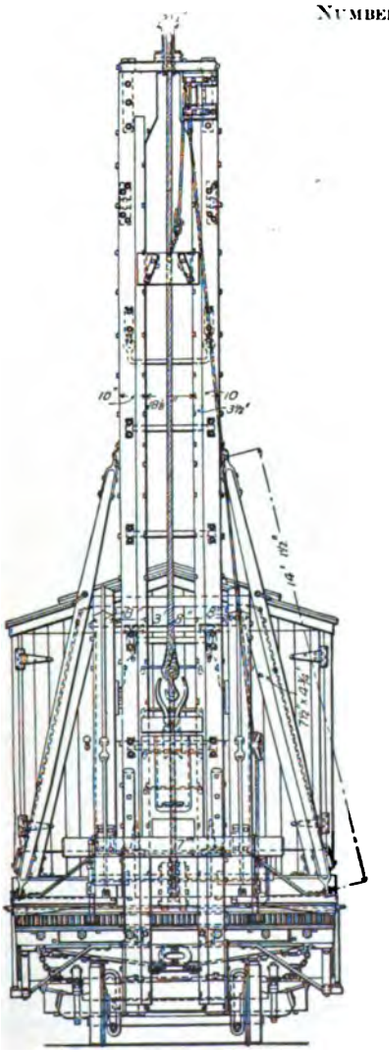


FIG. 353. FRONT END ELEVATION.

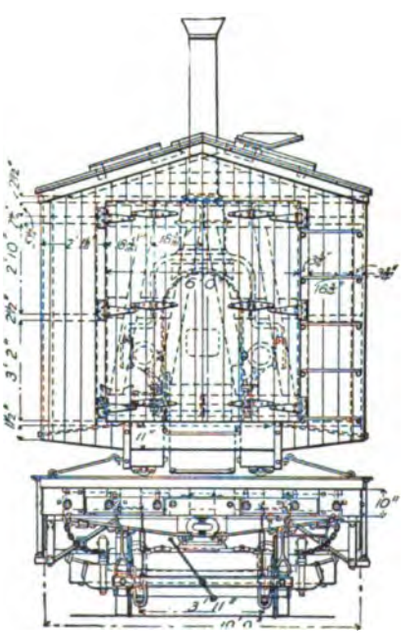


FIG. 354. REAR END ELEVATION

PILE DRIVER CAR. CHICAGO & NORTH WESTERN.

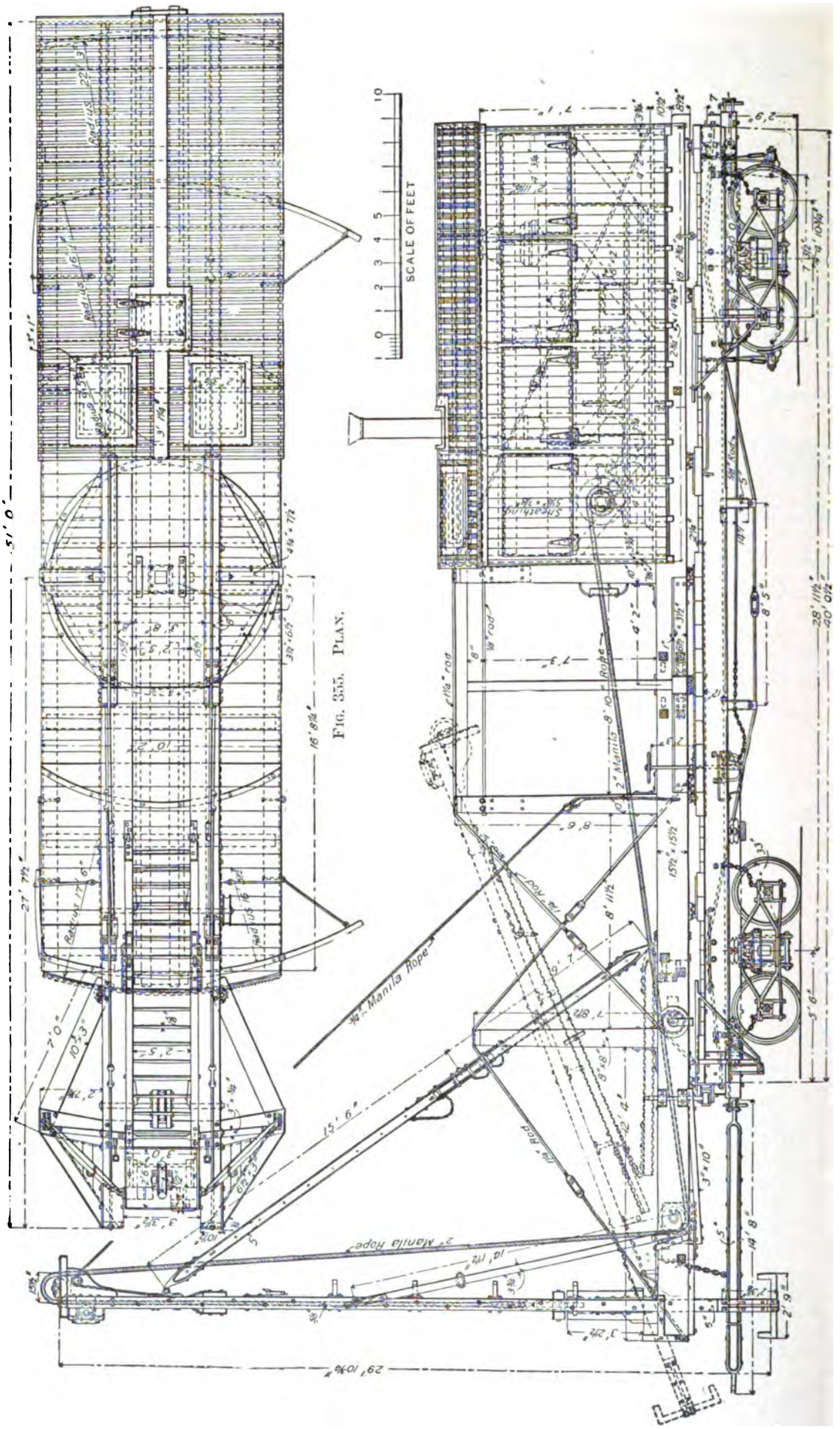


FIG. 355. PLAN.

FIG. 356. SIDE ELEVATION. PILE DRIVER CAR. CHICAGO & NORTH WESTERN.

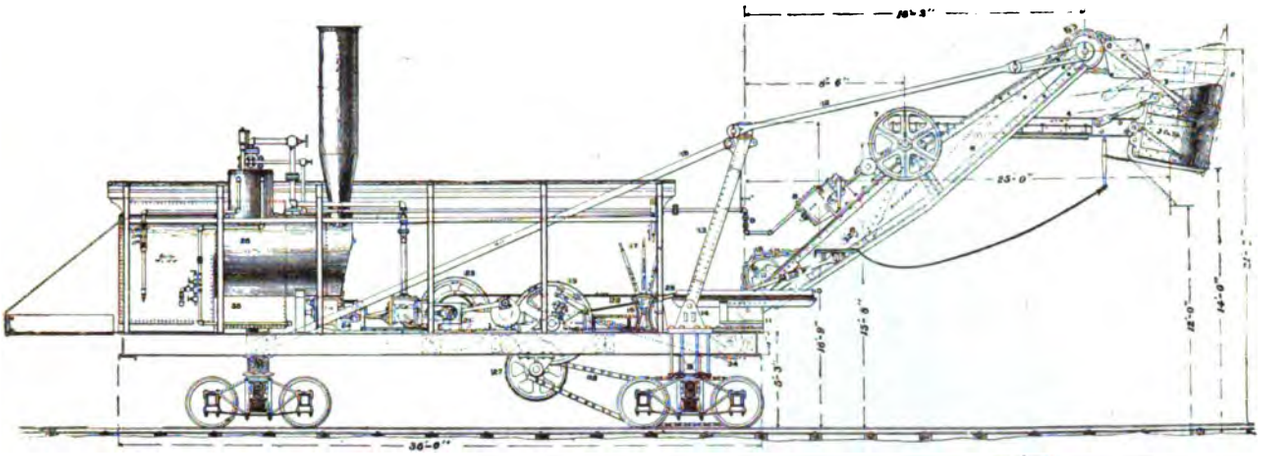


FIG. 357. SIDE ELEVATION.

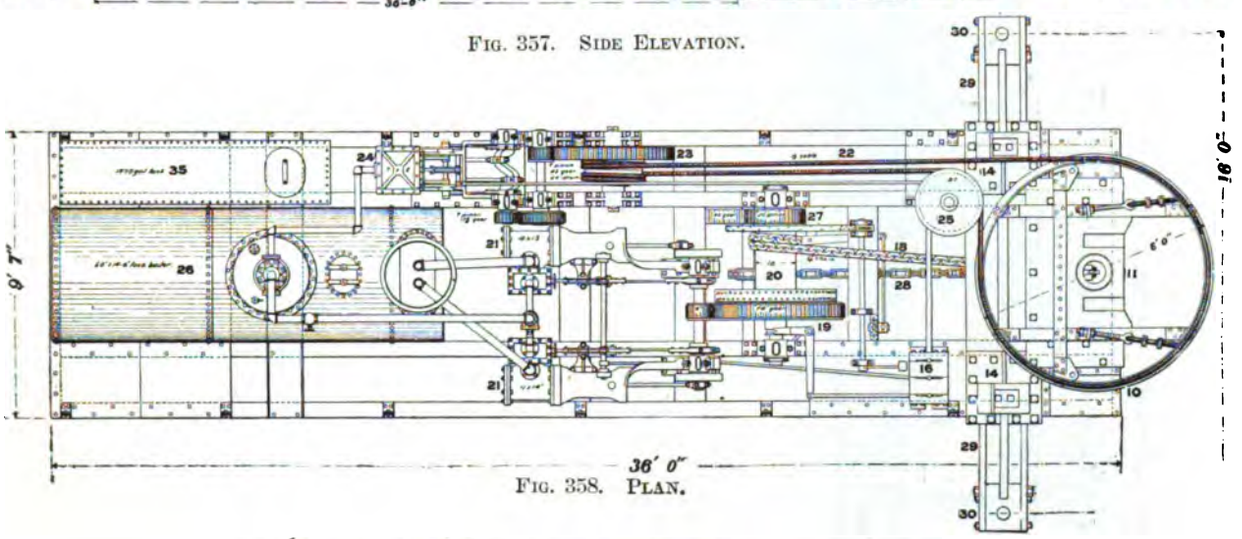


FIG. 358. PLAN.

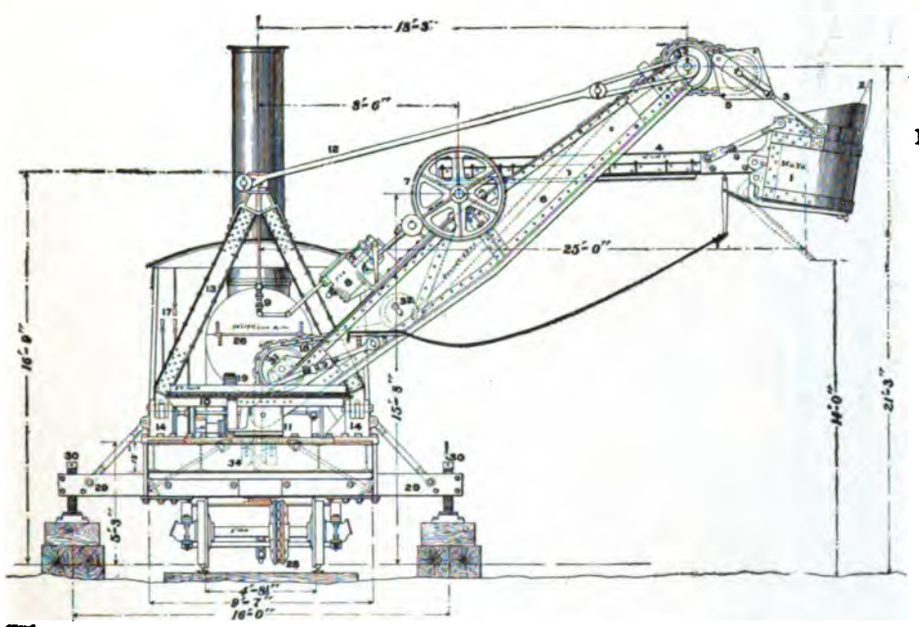
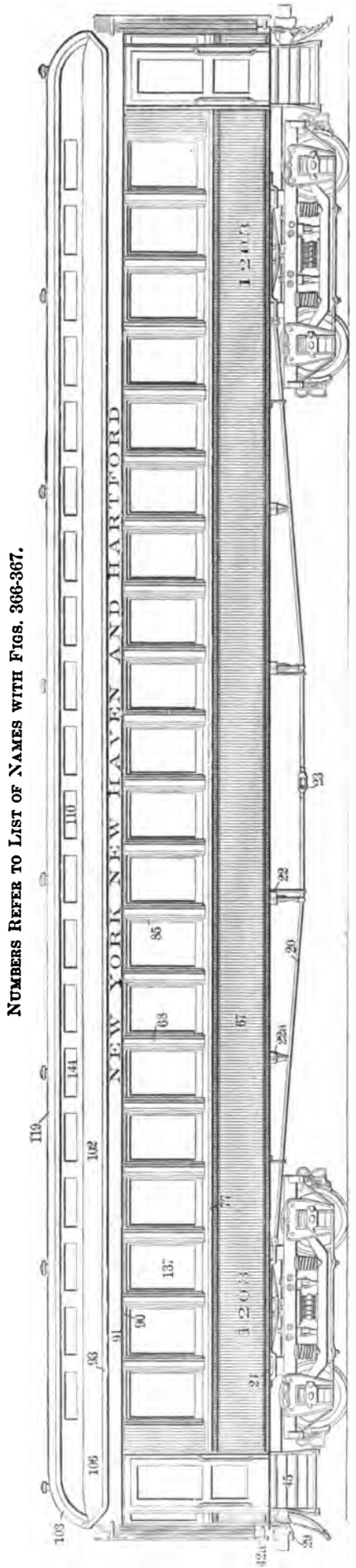


FIG. 359. END ELEVATION.
65 TON STEAM SHOVEL. VULCAN IRON WORKS CO., BUILDERS.

NAMES OF PARTS OF STEAM SHOVELS. FIGS. 357-359.

1. *Dipper*
2. *Dipper Teeth*
3. *Dipper Bail*
5. *Dipper Block*
6. *Boom*
7. *Shipper Shaft and Gears*
8. *Boom Engine*
9. *Steam Pipe*
10. *Swinging Circle*
11. *Boom Step and Trunnion*
12. *Boom Guys*
13. *A Frame*
14. *A Frame Step*
15. *Back Guy*
16. *Quadrant*
17. *Quadrant Levers*
18. *Hoisting Chain*
19. *Hoisting Gear*
20. *Hoisting Drum*
21. *Hoisting Engine*
22. *Swing Cables*
23. *Swing Gear and Drum*
24. *Swing Engines*
25. *Swing Figurehead*
26. *Boiler*
27. *Propelling Gear*
28. *Propelling Chain*
29. *Jack Arms*
30. *Jack Screws*
31. *Boom Foot Sheave*
32. *Boom Idler Sheave*
33. *Boom Point Sheave*
34. *Forefoot Sheave*
35. *Tank*



NUMBERS REFER TO LIST OF NAMES WITH FIGS. 366-367.

FIG. 360. SIDE ELEVATION.

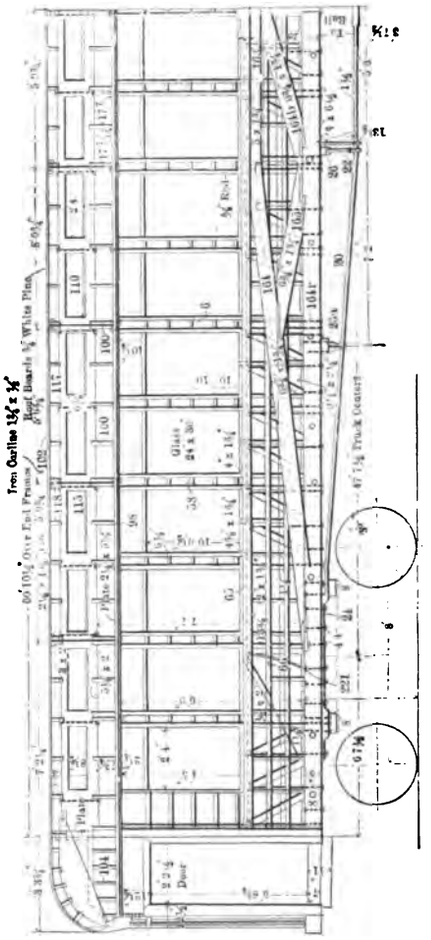


FIG. 362. HALF SIDE ELEVATION OF FRAMING.

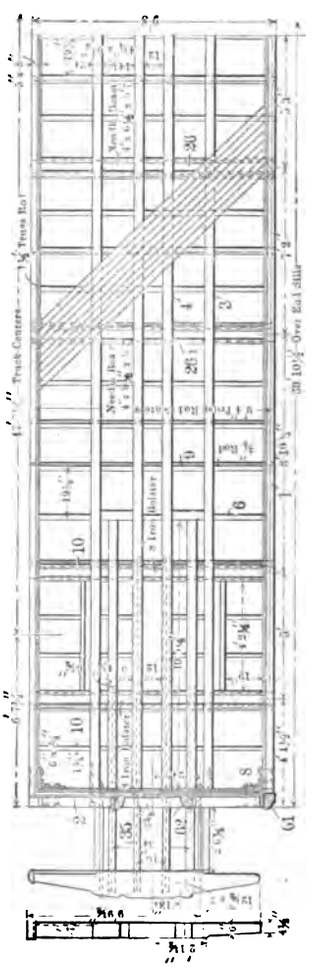
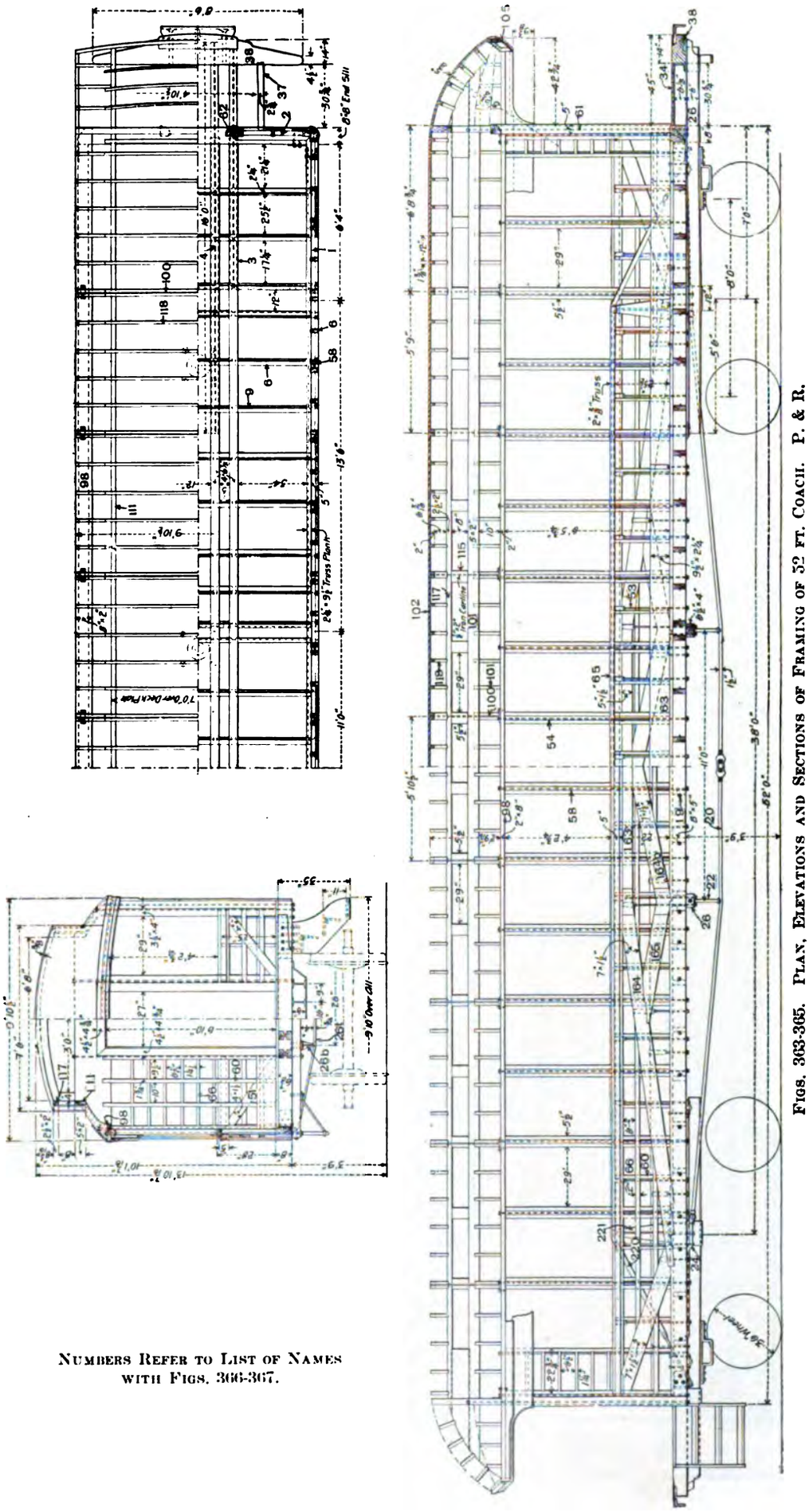


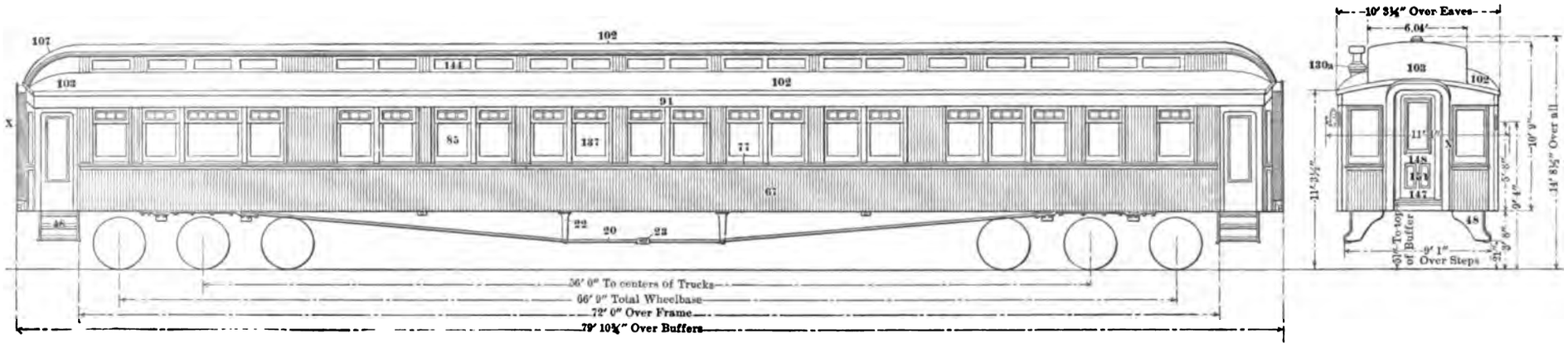
FIG. 361. HALF PLAN OF FRAMING.

FIRST-CLASS COACH. NEW YORK, NEW HAVEN & HARTFORD.



Figs. 363-365. Plan, Elevations and Sections of Framing of 52 ft. Coach. P. & R.

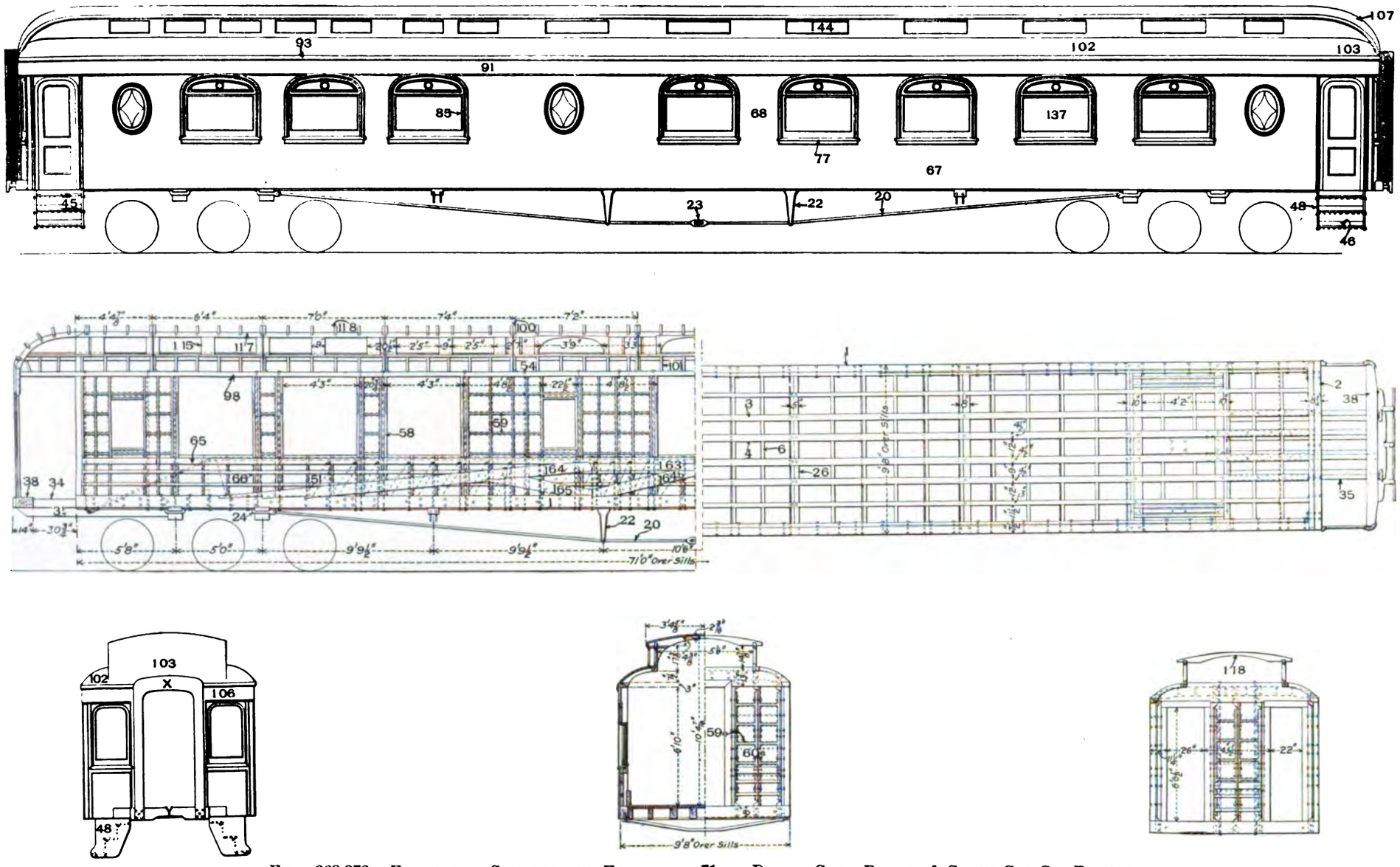
Numbers Refer to List of Names with Figs. 366-367.



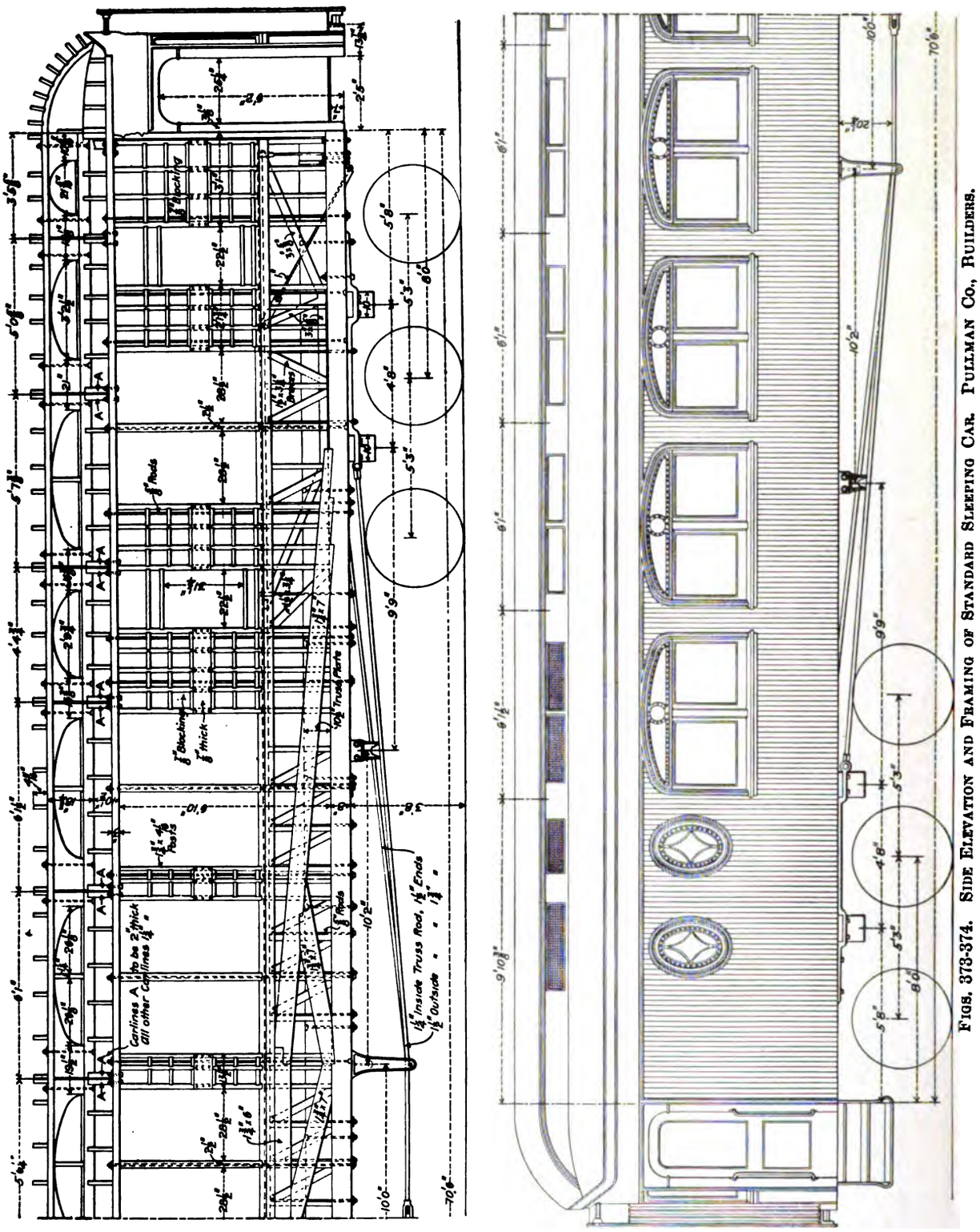
FIGS. 366-367. SIDE AND END ELEVATIONS OF 72 FT. COLONIST SLEEPING CAR. CAN. PAC. R. R.

LIST OF NAMES OF PARTS OF PASSENGER CAR BODIES. FIGS. 360-372.

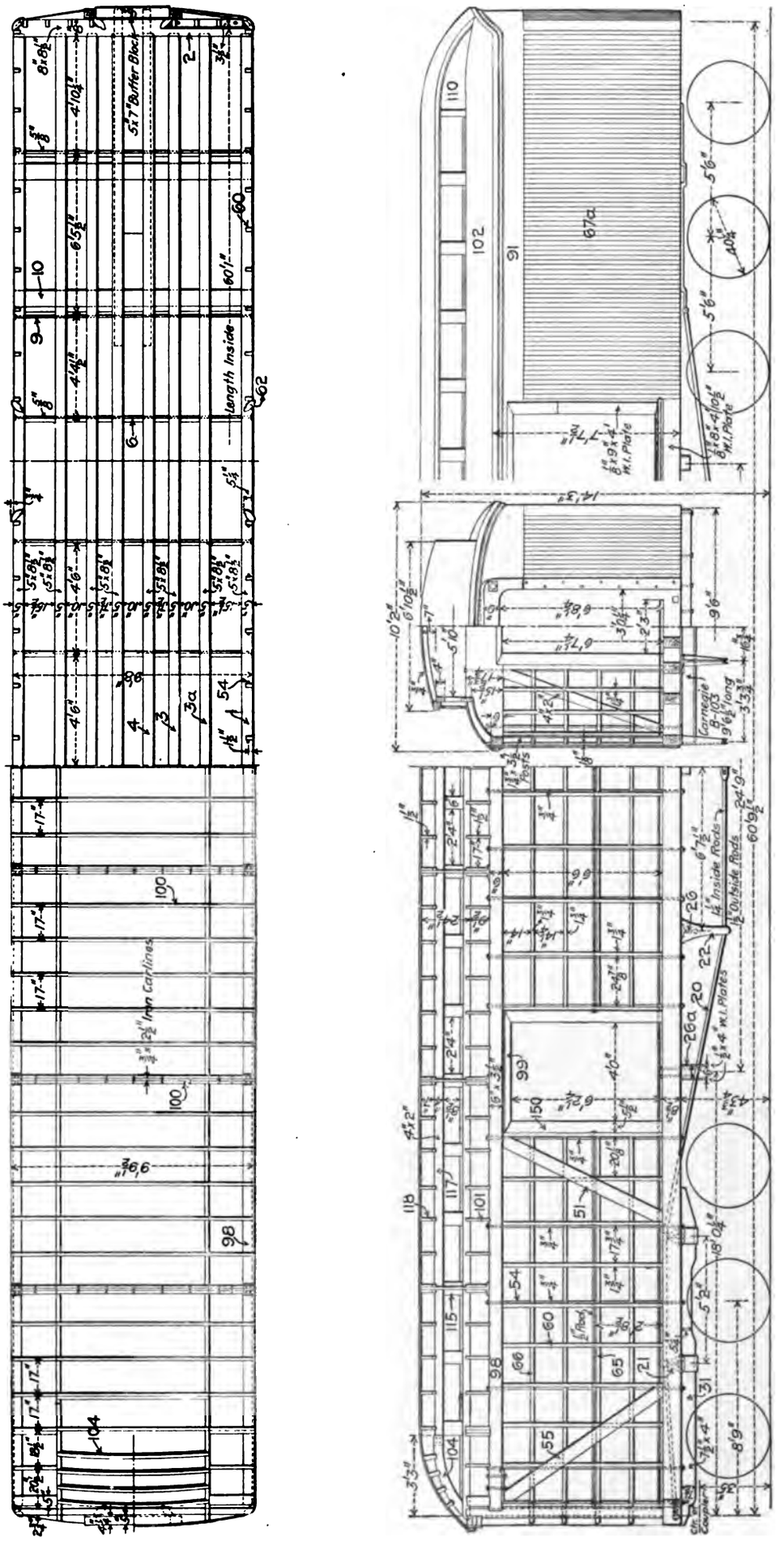
1. *Side Sill*
2. *End Sill*
3. *Intermediate Sill*
3a. *Outer Intermediate Sill*
4. *Center Sill*
6. *Bridging*
8. *Sill Knee Iron*
9. *Sill Tie Rod*
10. *Body Bolster*
19. *Same as* 9
20. *Body Truss Rod*
21. *Body Truss Rod Saddle*
22. *Body Queen Post*
23. *Turnbuckle*
24. *Truss Rod Anchor Iron*
26. *Cross Tie Timber*
26a. *Intermediate Cross Tie Timber*
26b. *Cross Tie Timber Truss Rod Queen Post*
26c. *Cross Tie Timber Truss Rod*
27. *Floor*
29. *Draw-bar*
31. *Draft Timber*
34. *Platform Floor*
35. *Platform Sill*
37. *Platform Short Sill*
38. *Platform End Sill*
42a. *Buffer Plate*
45. *Platform Step*
46. *Tread Board*
47. *Step Iron*
48. *Step Hanger*
51. *Brace*
52. *Brace Rod*
54. *Sill and Plate Rod*
55. *Counterbrace*
58. *Window Post*
60. *Stud*
61. *Corner Post*
62. *Door Post*
63. *Truss Plank*
65. *Belt Rail*
66. *Sheathing Rail*
67. *Outside Panel or Sheathing*
68. *Outside Window Panel or Sheathing*
69. *Sheathing Strips*
77. *Outside Window Sill*
85. *Window Sash*
90. *Window Lintel*
91. *Letter Board*
92. *Fascia Board*
93. *Eaves Moulding*
98. *Plate*
99. *Door Lintel*
100. *Carline or Compound Carline*
101. *Rafter*
102. *Roof Boards*
103. *Platform Roof*
104. *Platform Roof Carline*
105. *Platform Roof End Carline*
106. *Roof Apron*
107. *Platform Hood*
110. *Clear Story or Upper Deck*
111. *Deck Sill*
115. *Deck Post*
117. *Deck Plate*
118. *Upper Deck Carline*
119. *Upper Deck Eaves Moulding*
137. *Window*
144. *Deck Sash or Deck Window*
150. *Door Stile*
163. *Compression Beam*
164. *Compression Beam Brace*
164b. *Auxiliary Compression Beam Brace*
165. *Counterbrace*
167. *Overhang Brace Rod*
220. *Same as* 167
221. *Overhang Brace Rod Strut*



FIGS. 368-372. ELEVATIONS, SECTIONS AND FRAMING OF 71 FT. DINING CAR. BARNEY & SMITH CAR CO., BUILDERS.
BARNEY & SMITH STANDARD FRAMING FOR PASSENGER CAR BODIES.



FIGS. 373-374. SIDE ELEVATION AND FRAMING OF STANDARD SLEEPING CAR. PULLMAN CO., BUILDERS.



FIGS. 375-377. ELEVATION AND FRAMING OF 60 FT. BAGGAGE CAR. C., B. & Q.

NUMBERS REFER TO LIST OF NAMES WITH FIGS. 366-367.

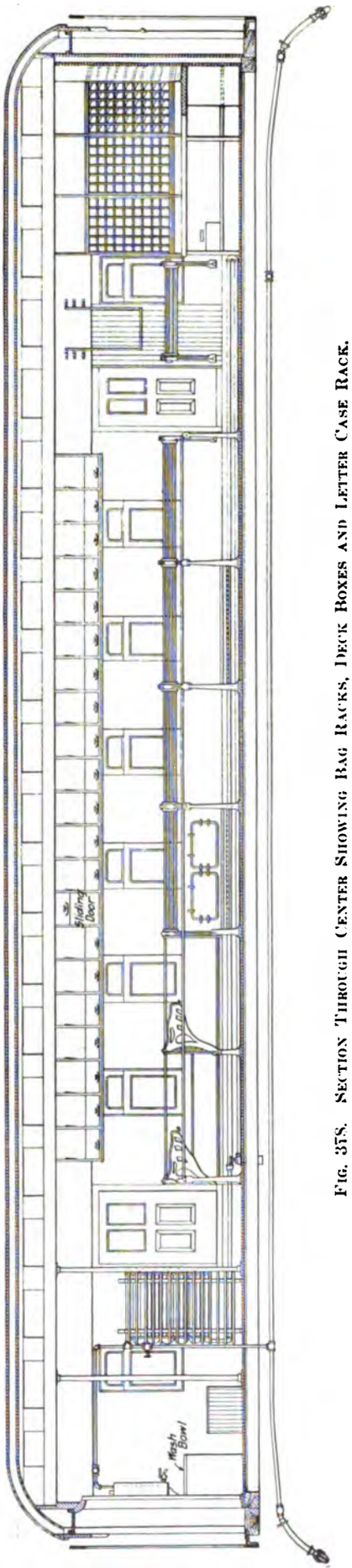


FIG. 378. SECTION THROUGH CENTER SHOWING BAG RACKS, DECK BOXES AND LETTER CASE RACK.

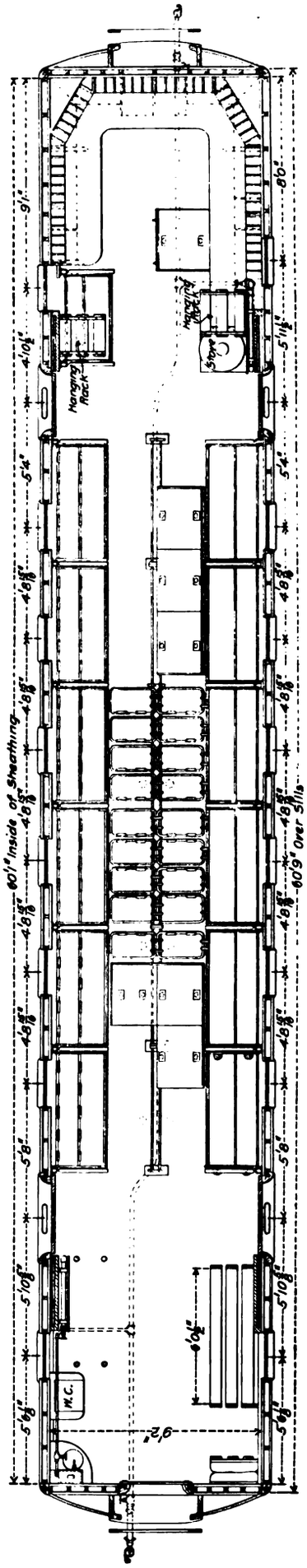


FIG. 379. FLOOR PLAN OF 60 FT. POSTAL CAR. CHICAGO & NORTHWESTERN.

Fig. 380. Side View, Showing Truss and Roof Framing.

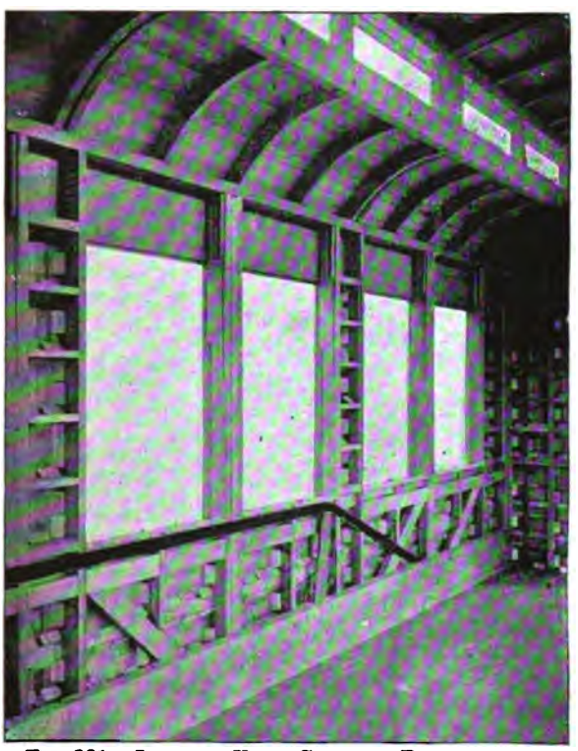


Fig. 381. Interior View, Showing Blocking and Overhang Truss-rod and Strut.

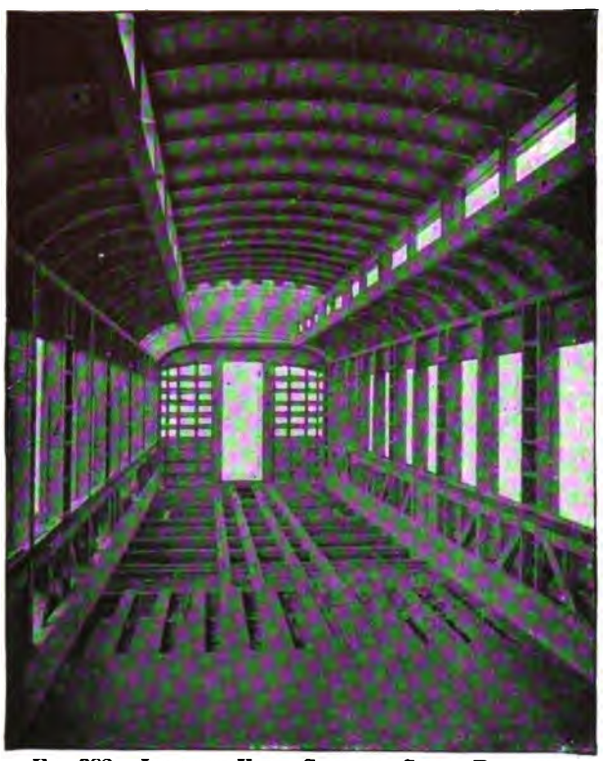


Fig. 382. Interior View, Showing Sills, Bridging, Truss-Plank, Trussing and Superstructure.

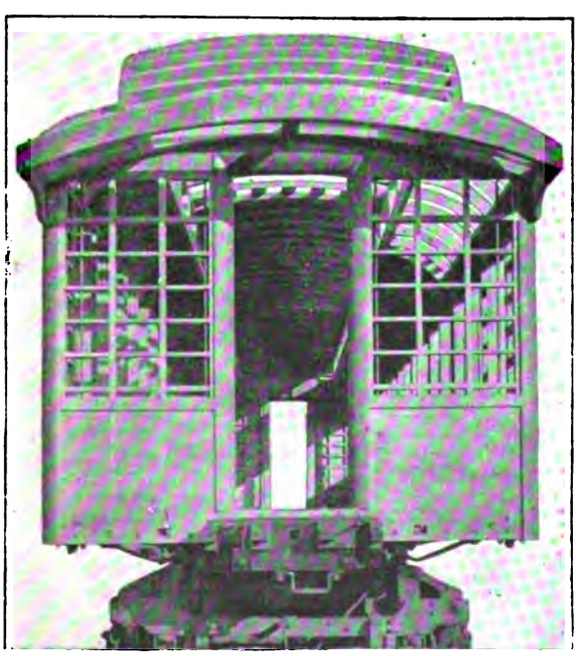


Fig. 383. End View, Showing Hood and End Framing.

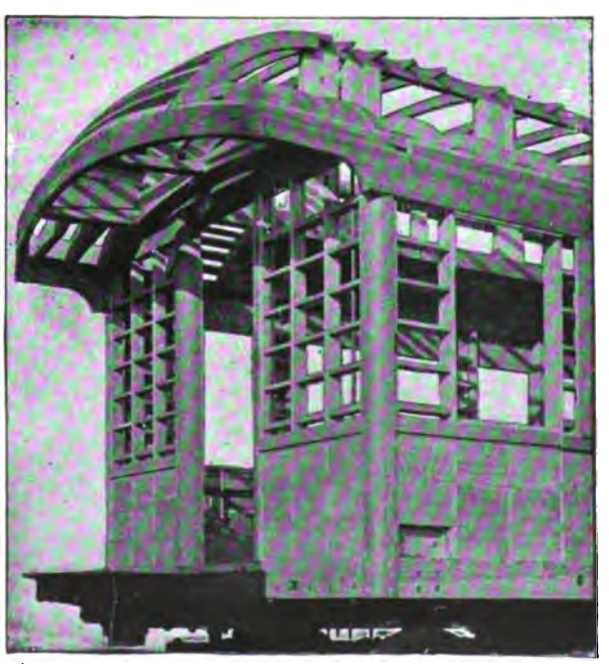


Fig. 384. Corner View, Showing Hood, End and Side Framing.

Names of Parts; Figs. 385-387.

20. *Body Truss Rod*
22. *Body Queen Post*
26. *Cross Tie Timber*
26t. *Cross Tie Timber Truss Rod*
26p. *Cross Tie Timber Truss Rod Bearing*
51. *Brace*
58. *Window Post*
59. *Sheathing Furring*
59b. *Furring Blocks*
59e. *End Sheathing or End Panel Furring*
60. *Stud*
60e. *End Studs*
61. *Corner Post*
62. *Door Post*
63. *Truss Plank*
65. *Belt Rail.*
65a. *Auxiliary Belt Rail*
66. *Sheathing Rail*
81. *Belt Rail Cap*
90. *Window Lintel*
93. *Eaves Moulding*
98. *Plate*
99. *Door Lintel*
100. *Compound Carline*
101. *Rafter*
102. *Roof Boards*
108. *Platform Hood Bow*
111. *Deck Sill*
115. *Deck Post*
117. *Deck Plate*
118. *Upper Deck Carline*
137. *Window*
163. *Compression Beam*
164. *Compression Beam Brace*
164b. *Auxiliary Compression Beam Brace*
165. *Counterbrace*
260. *Deck End Sill*

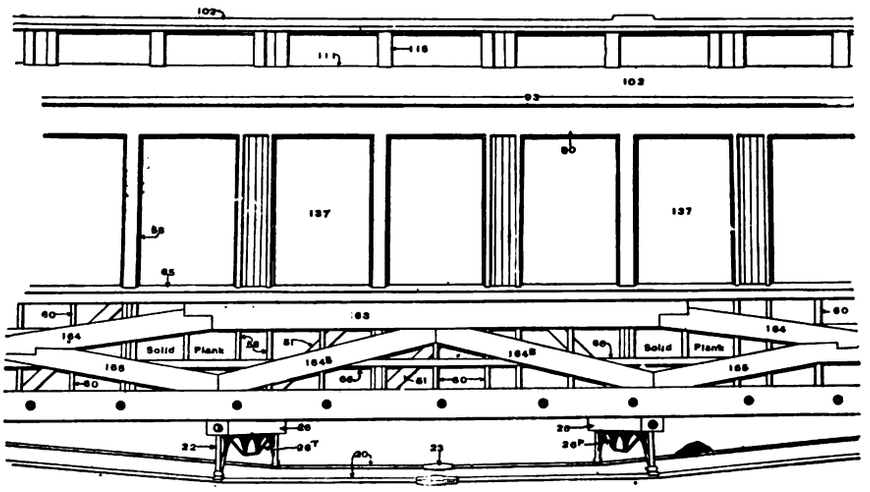


Fig. 385. Part Side Elevation.

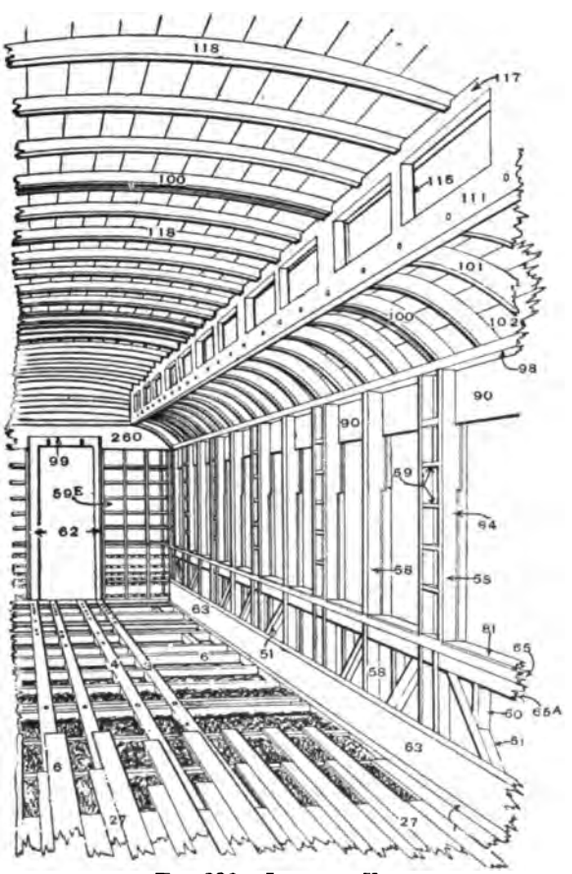


Fig. 386. Interior View.

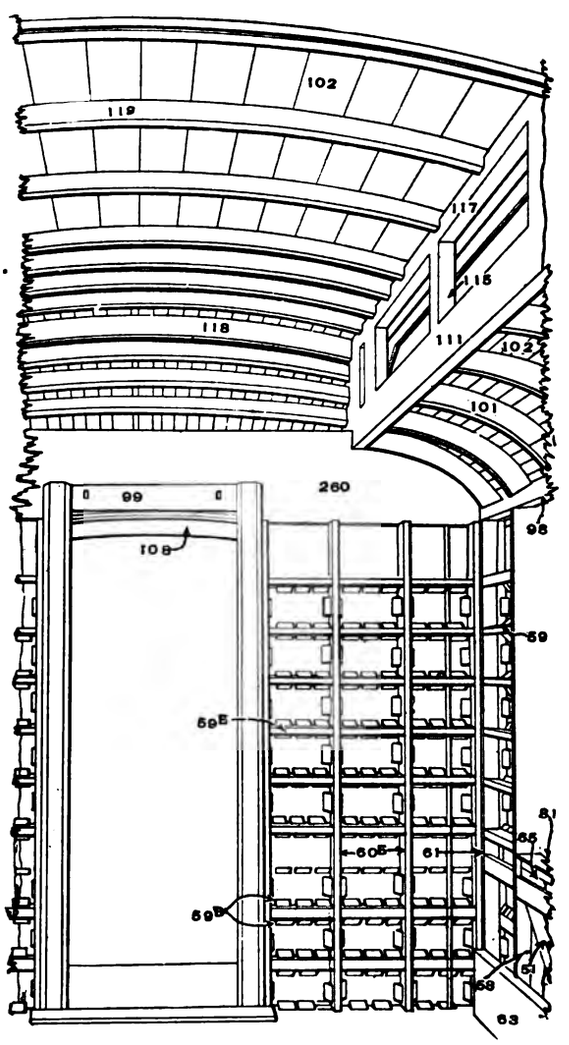


Fig. 387. Interior View.

Passenger Car Framing, Adopted by the Pullman Company.
Baltimore & Ohio, Wabash and Other Railroads.

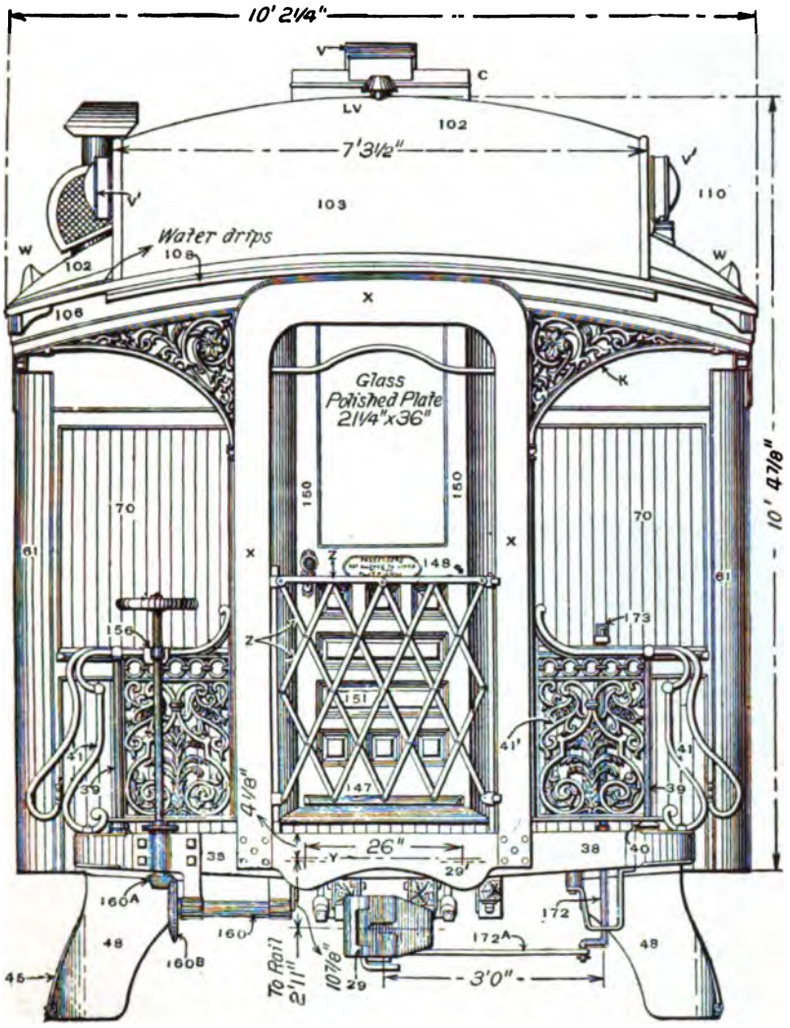


FIG. 388. END ELEVATION.
FIRST-CLASS PASSENGER COACH.

NAMES OF PARTS, FIGS. 388-391.

1. *Side Sill*
2. *End Sill*
3. *Intermediate Sill*
3a. *Outer Intermediate Sill*
4. *Center Sill*
6. *Bridging*
7. *Floor Timber Brace*
9. *Sill Tie Rod*
10. *Body Bolster*
20. *Body Truss Rod*
22. *Body Queen Post*
22b. *Body Queen Post Brace*
23. *Turnbuckle*
26. *Cross Tie Timber*
27. *Floor*
28. *Deafening Ceiling*
29. *Drawbar or Coupler*
29. *Vestibule Buffer Plate*
35. *Platform Sill*
37. *Platform Short Sill*
38. *Platform End Sill*
39. *Platform Railing Post*
40. *Base Washer for Platform Railing Post*
41. *Platform Rail*
44. *Body Hand Rail*
45. *Platform Step*
48. *Step Hanger*
51. *End Brace*
54. *End Sill and Plate Rod*
58. *Window Post*
61. *Corner Post*
62. *Door Post*
63. *Truss Plank*
65. *Belt Rail*
65a. *Window Sill Cornice Board*
66. *Sheathing Rail*
67. *Outside Panel or Sheathing*
70. *Sheathing*
74. *Lower Wainscot Rail*
75. *Upper Wainscot Rail*
76. *Wainscot Panel*
77. *Outside Window Sill*
78. *Inside Window Sill*
80. *Window Sill Moulding*
82. *Upper Belt Rail*
85. *Window Sash*
86. *Window Blind Sash*
87. *Window Cove Moulding*
88. *Window Moulding*
89. *Inside Window Panel*
90. *Window Lintel*
91. *Letter Board*
92. *Fascia Board*
93. *Eaves Moulding*
94. *Inside Cornice*
95. *Inside Cornice Fascia Board*
97. *Inside Lining*
98. *Plate*
99. *Door Lintel*
100. *Compound Carline*
101. *Rafter*
102. *Roof Boards*
104. *Platform Roof Carline*
105. *Platform Roof End Carline*
106. *Roof Apron*
108. *Platform Hood Post.*
110. *Clear Story or Upper Deck.*
111. *Deck Sill*
112. *Deck Bottom Rail*
113. *Deck End Sill*
114. *Deck Sill Facing*
114a. *Deck Sill Sub-facing*
115. *Deck Post*
116. *Deck End Panel or Ventilator*
118. *Upper Deck Carline*
120. *Inside Deck Cornice*
121. *Deck Plate*
121a. *Deck Soffit Board*
122. *Car Seat*
123. *Seat End or Aisle Seat End*
124. *Seat Stand*
125. *Seat Back*
137. *Window*
140. *Window Blind*
140a. *Window Shade*

(CONTINUED.)

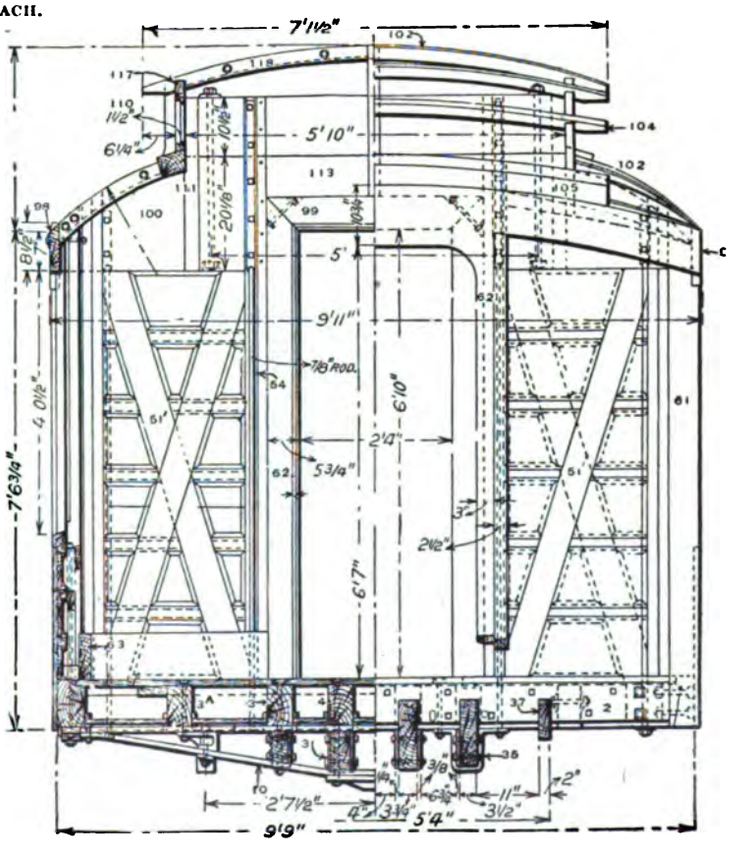
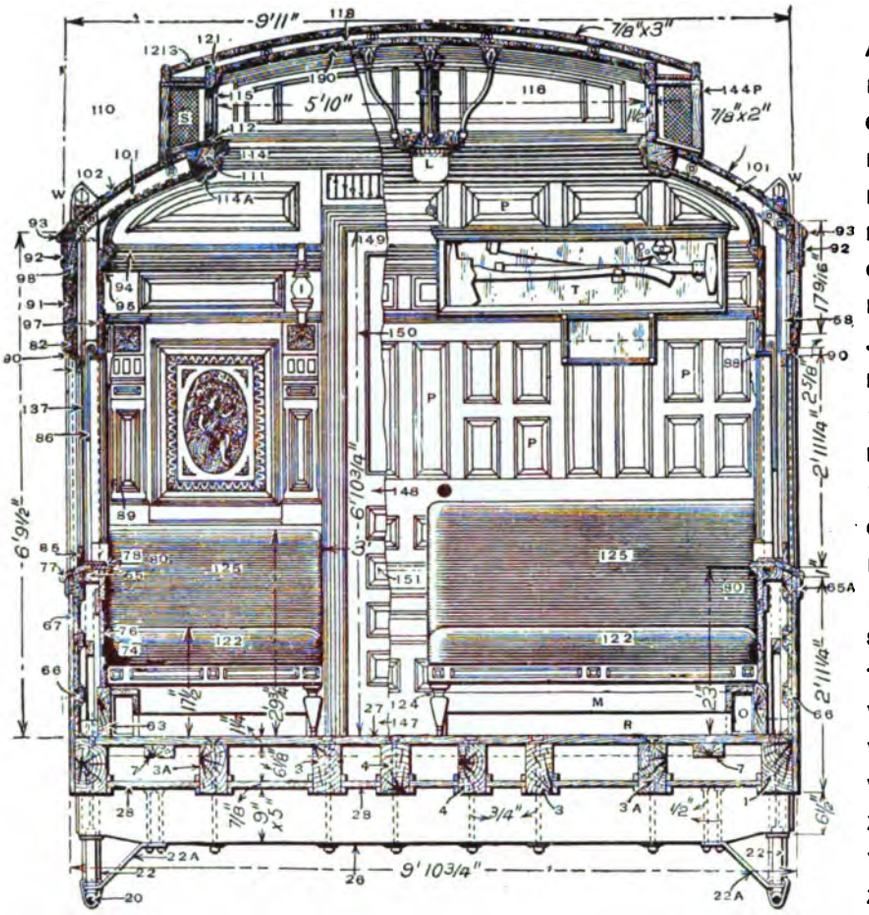


FIG. 389. END ELEVATION OF FRAMING.
FIRST-CLASS PASSENGER COACH.



A. *Basket Rack*
B. *Bell Cord and Hanger*
C. *Frost Carburetor*
D. *Deck Sash Window Opener*
E. *Base of Pilaster*
F. *Cap of Pilaster*
G. *Rafter Ribs and Cornices*
H. *Heater or Seat Radiator*
J. *Sash Lift*
K. *Platform End Bracket*
L. *Center Lamp*
L. *Vestibule Lamp Ventilator*
M. *Seat Frame*
O. *Box for Heating Pipes*
P. *Panels*
R. *Seat Radiator, same as* H
S. *Deck Window Screens*
T. *Emergency Tool Box*
V. *Lamp Jack or Ventilator*
V. *Saloon Ventilator*
W. *Window Sash Balance*
X. *Vestibule Face Plate*
Y. *Vestibule Buffer Plate*
Z. *Vestibule Gate.*

FIG. 390. TRANSVERSE SECTION SHOWING INTERIOR.
FIRST-CLASS PASSENGER COACH.

NAMES OF PARTS, FIGS. 388-391.

(CONTINUED.)

144. *Deck Sash or Deck Window*
144p. *Deck Screen Post*
145 or A. *Continuous Basket Rack*
147. *Bottom Door Rail*
148. *Middle Door Rail*
149. *Top Door Rail*
150. *Door Stile*
151. *Door Panel*
152. *Brake Shaft*
156. *Upper Brake Shaft Bearing*
157. *Brake Hand Wheel*
160. *Brake Chain Worm*
160a. *Brake Chain Sheave*
160b. *Brake Shaft Bevel Gear Wheel*
172. *Uncoupling Shaft*
172a. *Uncoupling Rod*
173. *Uncoupling Lever*
190. *Ceiling*

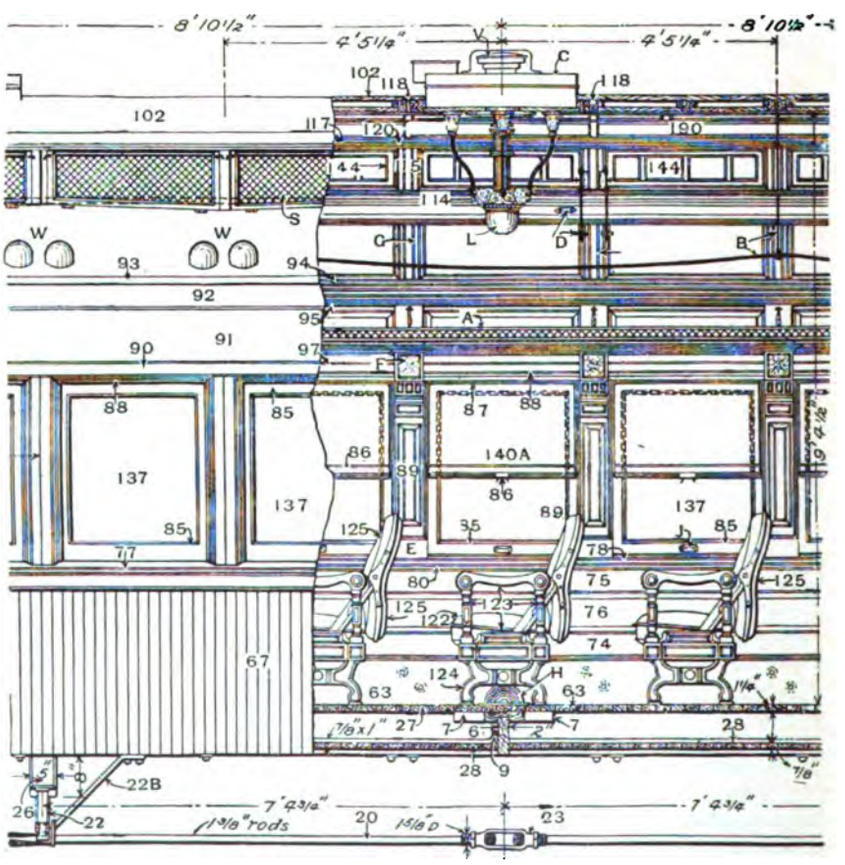


FIG. 391. SECTIONAL SIDE ELEVATION, SHOWING EXTERIOR AND INTERIOR.
FIRST-CLASS PASSENGER COACH.

The car shown in Figs. 388-391 is not a modern design but is shown for the references only, the parts being practically the same in new cars.

Names of Parts, Figs. 392-398.

1. *Side Sill*
3. *Intermediate Sill*
4. *Center Sill*
17. *Door Sill Plate*
27. *Car Floor*
27b. *Sub-Car Floor*
54. *Sill and Plate Rod*
58. *Window Post*
59. *Window Panel or Sheathing Furring*
63. *Truss Plank*
65. *Belt Rail*
66. *Sheathing Rail*
67. *Sheathing*

Names of Parts (Continued).

76. *Middle Wainscot Rail or Panel*
17. *Outside Window Sill*
78. *Inside Window Sill*
82. *Upper Belt Rail*
85. *Outside Window Sash*
85a. *Upper Outside Window Sash*
86. *Inner Window Sash*

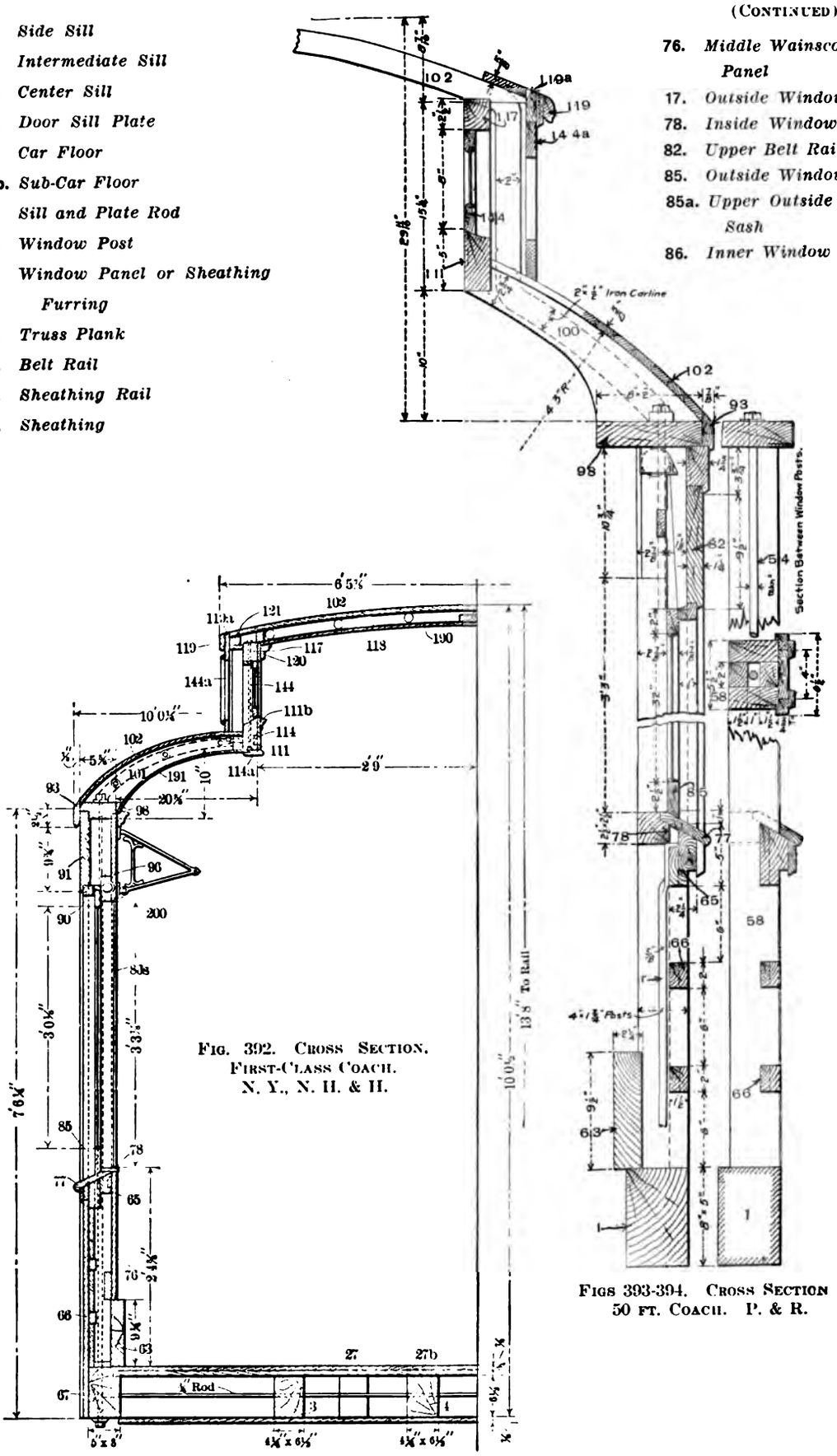
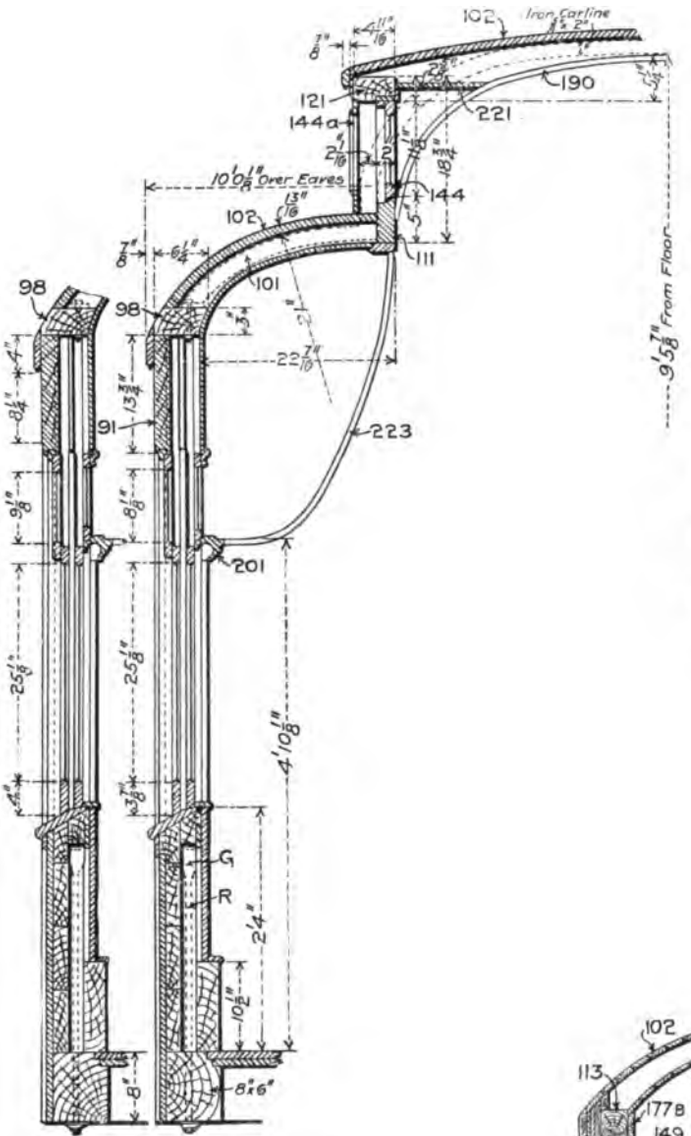


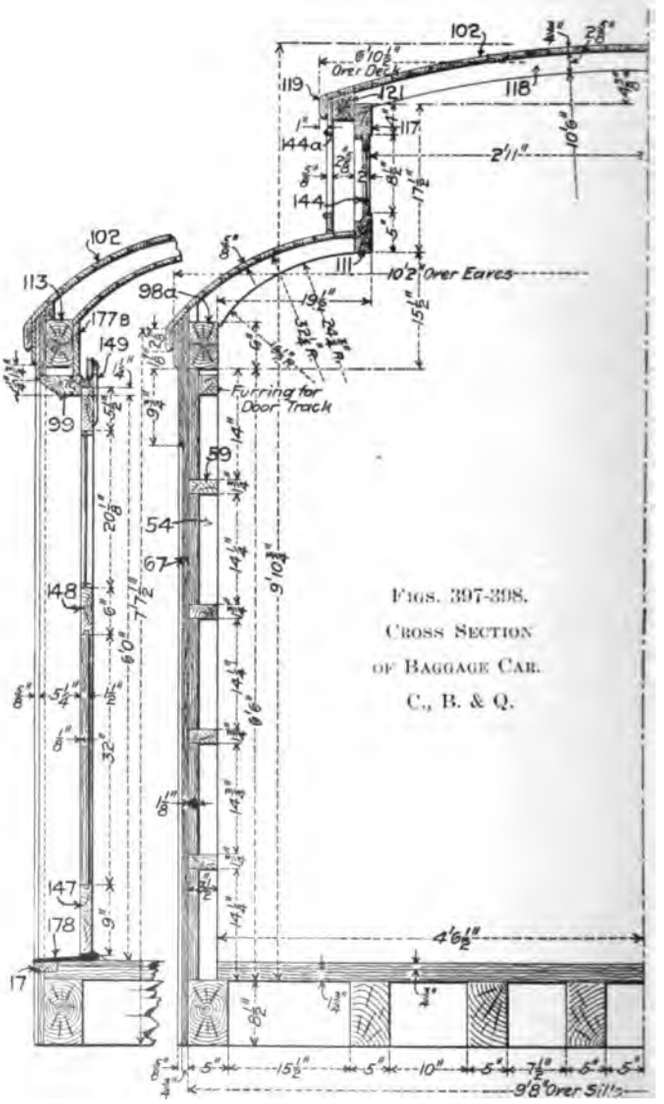
Fig. 392. Cross Section, First-Class Coach. N. Y., N. H. & H.

Figs 393-394. Cross Section 50 ft. Coach. P. & R.



Figs. 395-396. Cross Section of Standard Sleeping Car, Pullman Co.

117. *Deck Plate*
118. *Upper Deck Carline*
119. *Deck Eaves Fascia Board*
119a. *Deck Eaves Sub-Fascia Board*
120. *Deck Inside Cornice*
121. *Deck Plate*
144. *Deck Sash or Window*
144a. *Outer Deck Sash for Screen*
147. *Bottom Door Rail*
148. *Middle Door Rail*
177b. *Inside Lining*
178. *Threshold Plate*
190. *Deck Ceiling Veneered*
191. *Lower Deck Veneered Ceiling*
200. *Roller for Shade*
201. *Moulding for Shade Roller Box*
221. *Ceiling Furring Brace*
223. *Berth Front Panel*
G. *Overhang Truss*
R. *Overhang Truss Tie Rod*



Figs. 397-398. Cross Section of Baggage Car, C., B. & Q.

Names of Parts, Figs. 392-398 (Continued).

86s. *Window Blind*
90. *Window Lintel*
91. *Letter Board*
93. *Eaves Fascia Board*
94. *Inside Cornice*
96. *Inside Lining*
98. *Plate*
98a. *Same as* 98
99. *Door Lintel*
100. *Compound Carline*
101. *Rafter*
102. *Roof Boards*
111. *Deck Sill*
111b. *Deck Sill Top Moulding*
112. *Deck Bottom Rail*
113. *Same as* 98
114. *Deck Sill Facing*
114a. ***Deck Sill Bottom Moulding***

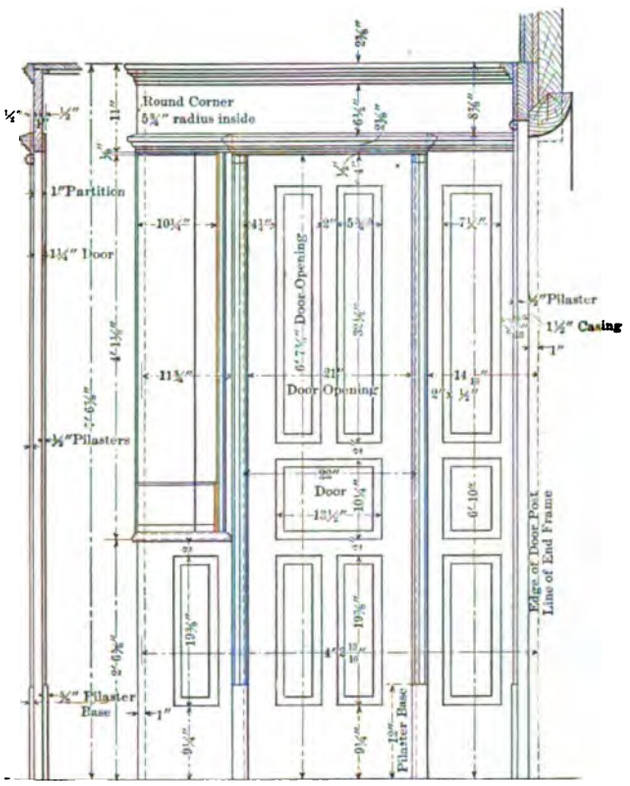
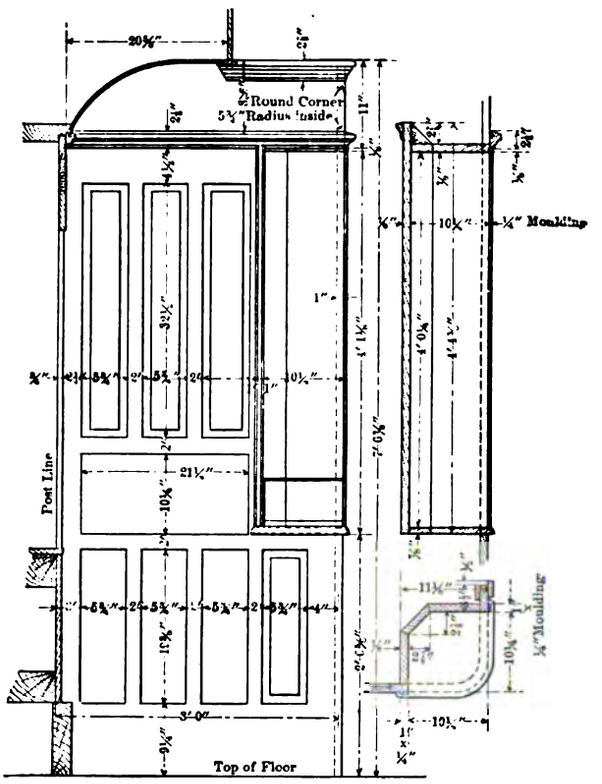


FIG. 399. EXTERIOR FINISH OF SALOON. FIRST-CLASS COACH. N. Y., N. H. & H.



FIGS. 400-402. FINISH OF SALOON CROSS PARTITION, LADIES' SALOON. FIRST-CLASS COACH. N. Y., N. H. & H.

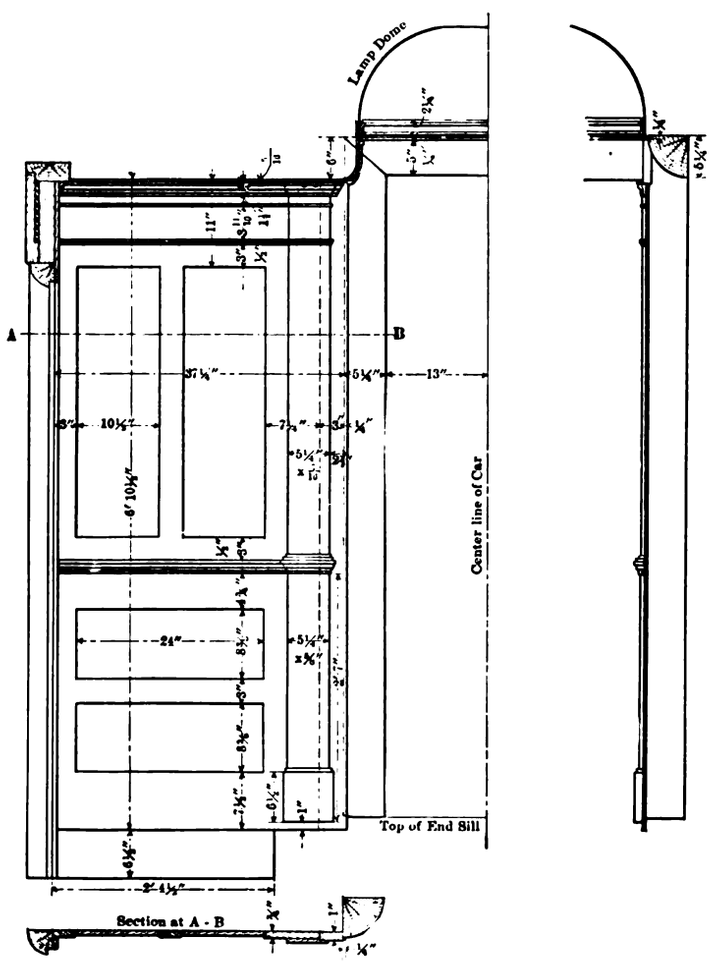


FIG. 403-405. END FINISH ON BODY OF CAR. FIRST-CLASS COACH. N. Y., N. H. & H.

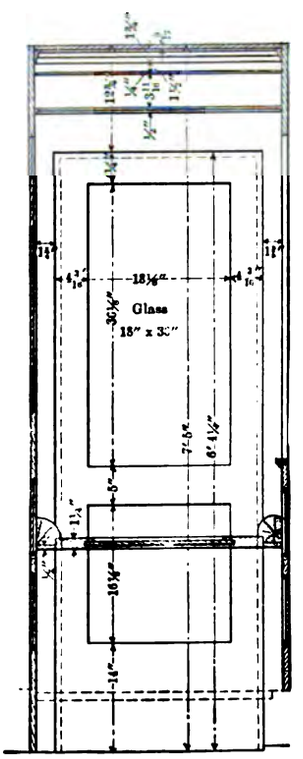


FIG. 406. WIDE VESTIBULE SIDE DOOR AND CASING. FIRST-CLASS COACH. N. Y., N. H. & H.

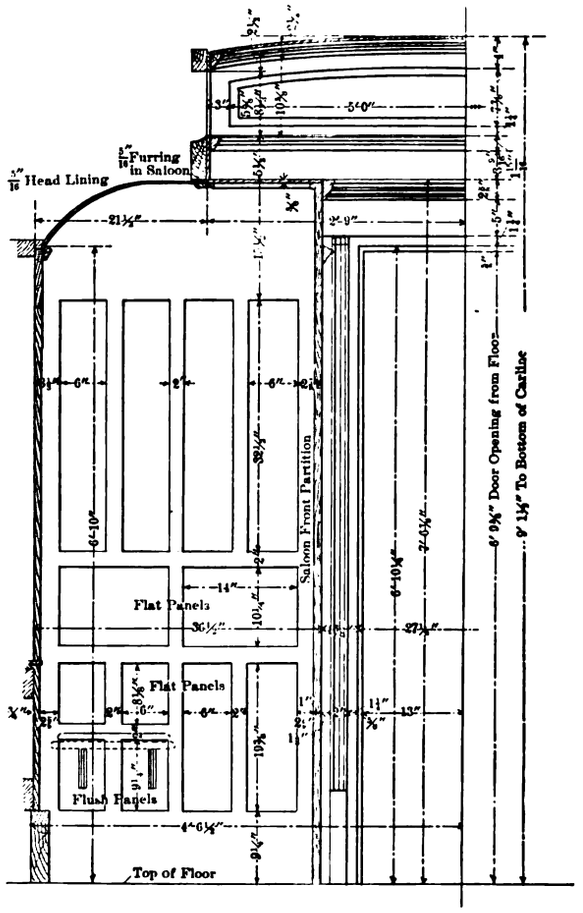
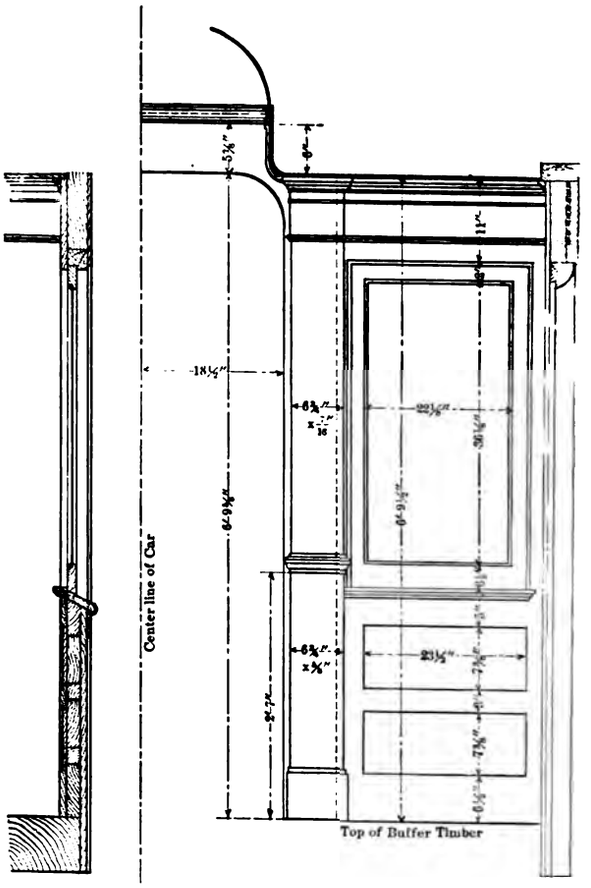
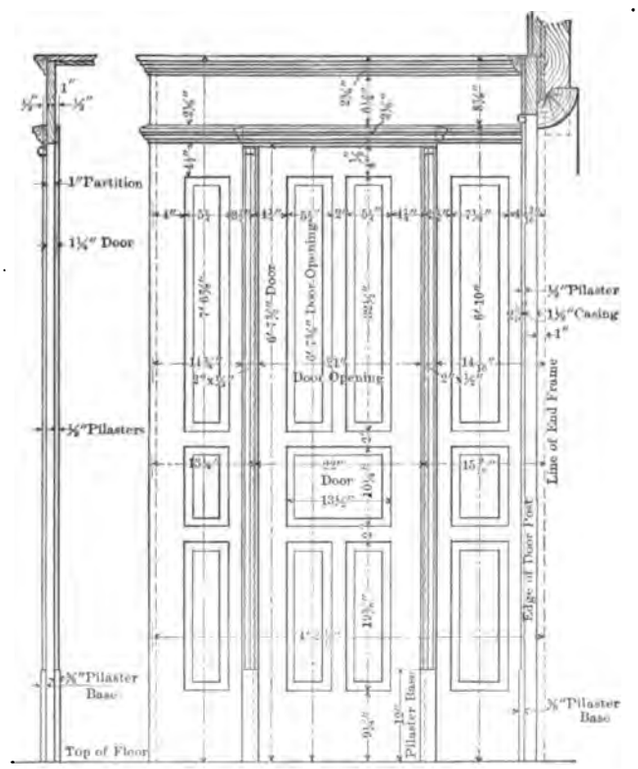


FIG. 407. END FINISH, INTERIOR OF SALOON. FIRST-CLASS COACH. N. Y., N. H. & H.



FIGS. 408-409. FINISH ON VESTIBULE FRAME. FIRST-CLASS COACH. N. Y., N. H. & H.



FIGS. 410-411. FINISH OF SALOON FRONT PARTITION. MEN'S SALOON. FIRST-CLASS COACH. N. Y., N. H. & H.

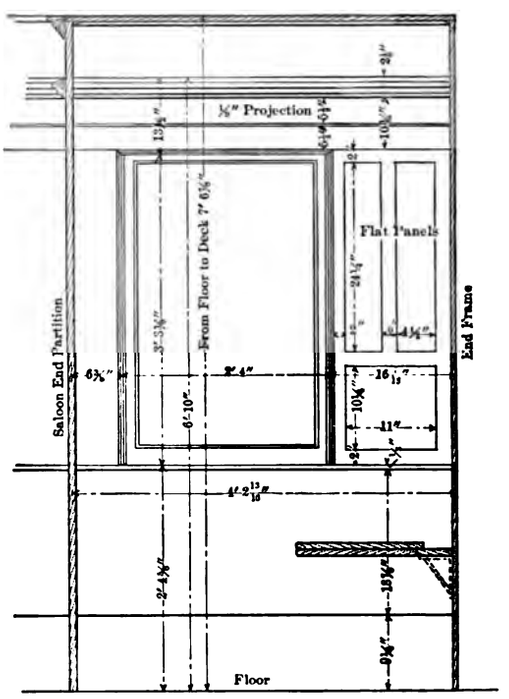


FIG. 412. SIDE FINISH, INTERIOR OF SALOON. FIRST-CLASS COACH. N. Y., N. H. & H.

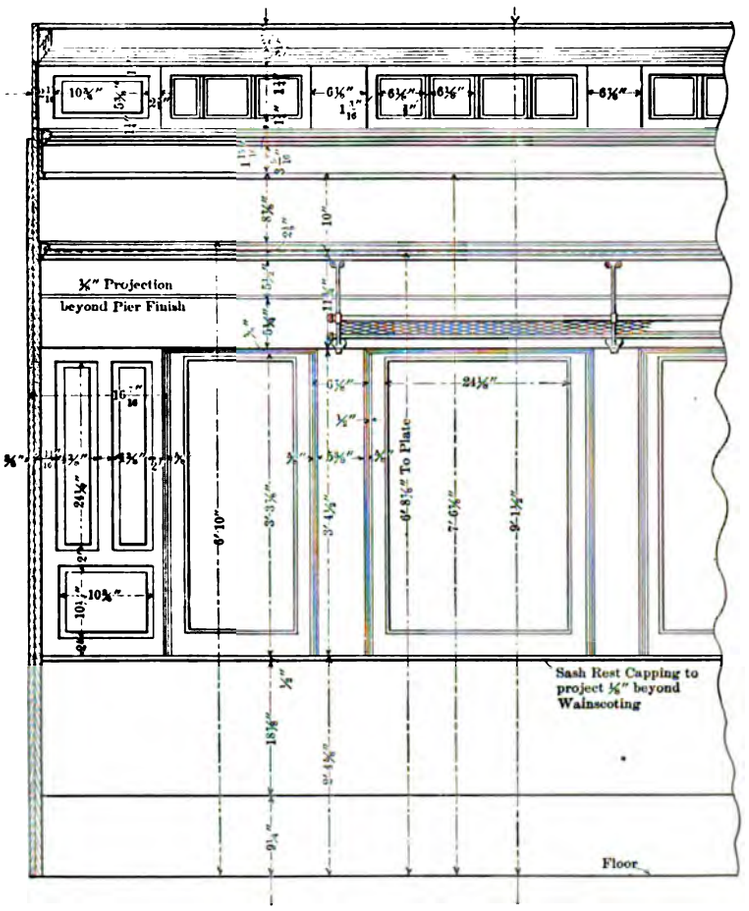


FIG. 413. SIDE FINISH OF PASSENGER CAR. FIRST-CLASS COACH. N. Y., N. H. & H.

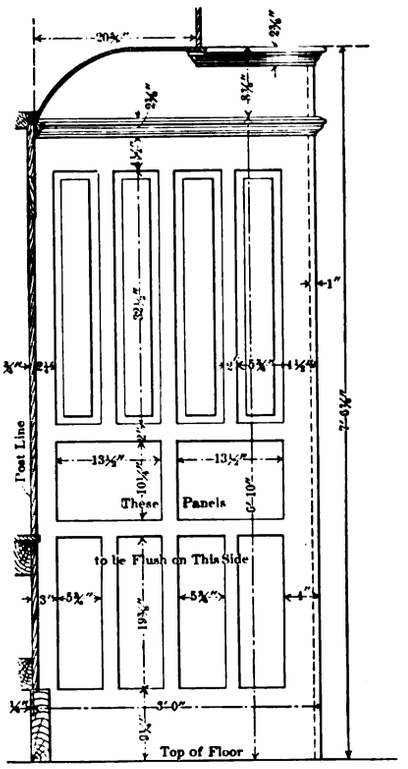
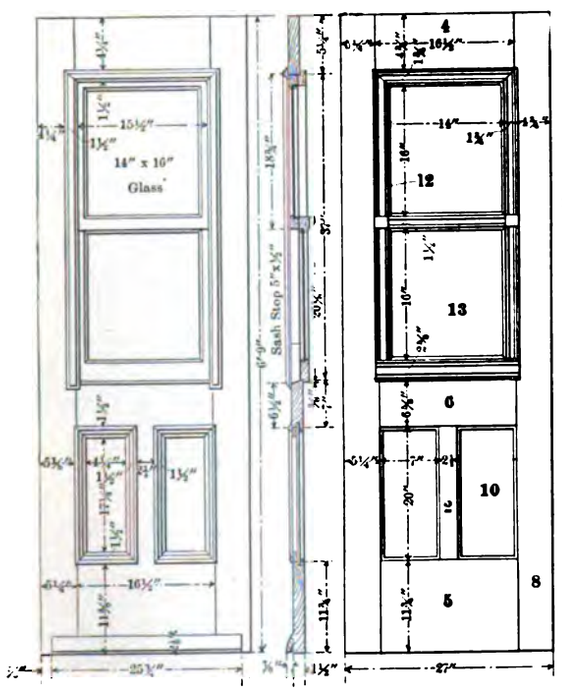
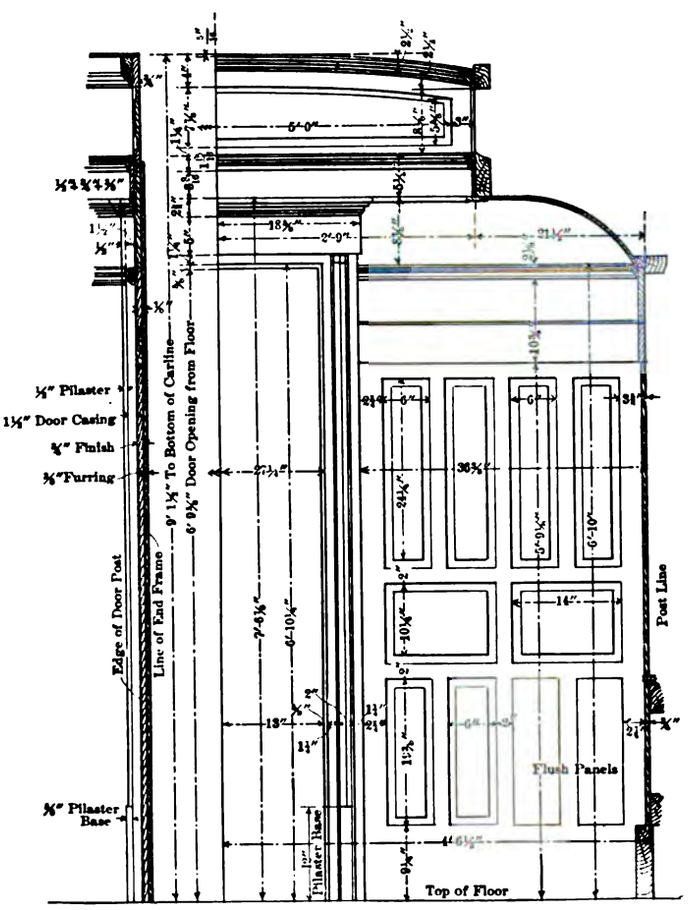


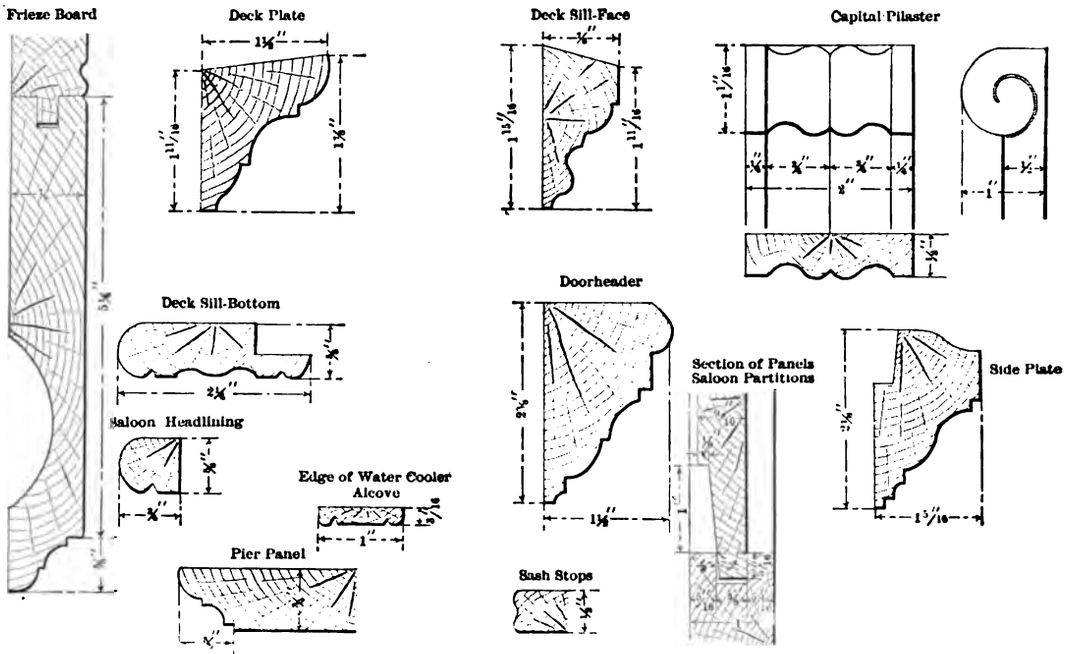
FIG. 414. FINISH OF SALOON CROSS PARTITION, MEN'S SALOON. FIRST-CLASS COACH. N. Y., N. H. & H.



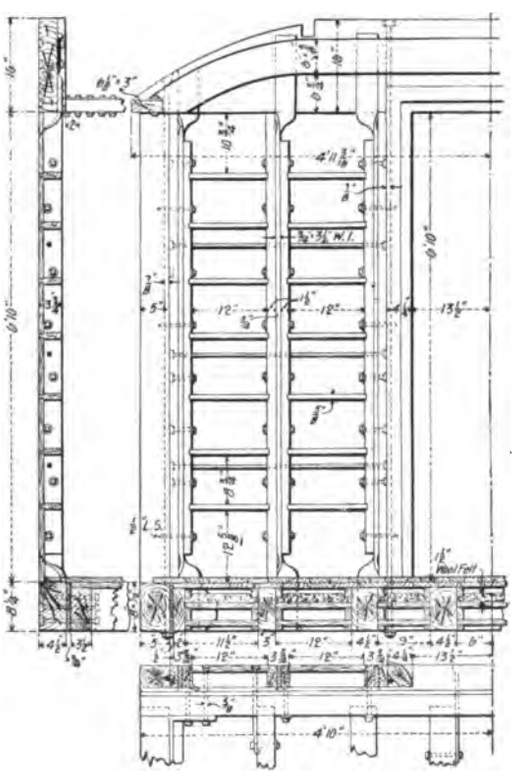
FIGS. 415-417. FINISH OF STANDARD END DOOR. (111) FIRST-CLASS COACH. N. Y., N. H. & H.



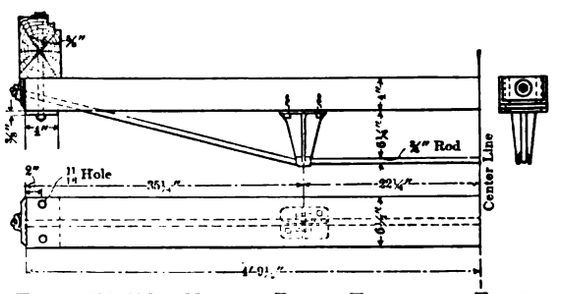
FIGS. 418-419. END FINISH, FIRST-CLASS COACH. N. Y., N. H. & H.



FIGS. 420-432. DETAILS OF MOULDINGS AND PANELS, INTERIOR FINISH OF FIRST-CLASS COACH. N. Y., N. H. & H.



FIGS. 433-435. STANDARD COMPOSITE END FRAMING. L. S. & M. S. AND OTHER VANDERBILT LINES.



FIGS. 436-438. NEEDLE BEAM TRUSSING. FIRST-CLASS COACH. N. Y., N. H. & H.

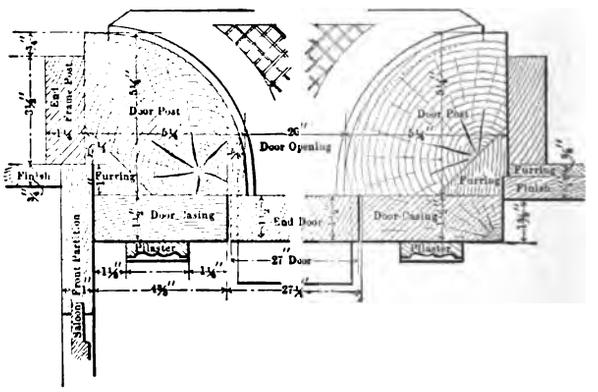
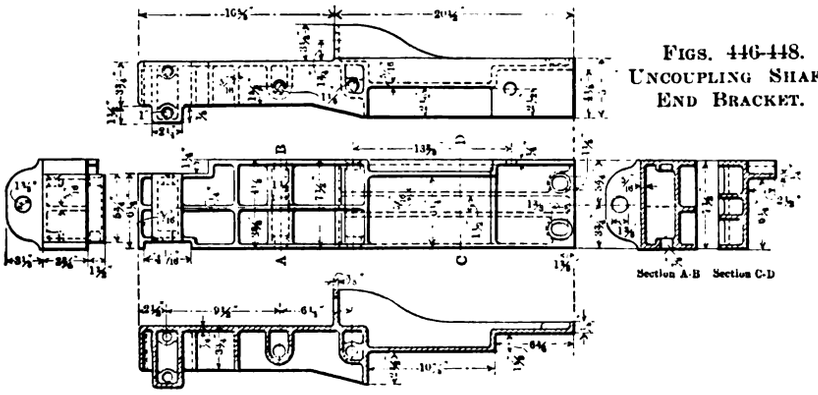
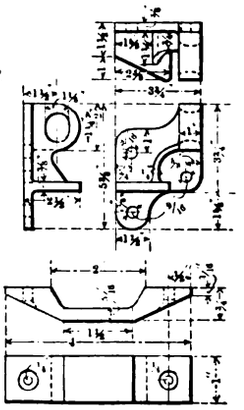


FIG. 439. HORIZONTAL SECTION THROUGH END FRAME AT DOOR. FIRST-CLASS COACH. N. Y., N. H. & H.

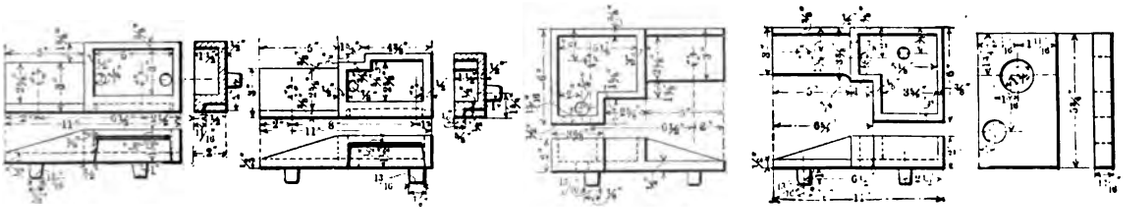


FIGS. 440-445. GOULD MALLEABLE IRON DRAFT BEAM.

FIGS. 446-448. UNCOUPLING SHAFT END BRACKET.



FIGS. 449-450. DOOR WEDGE GUIDE PLATE.



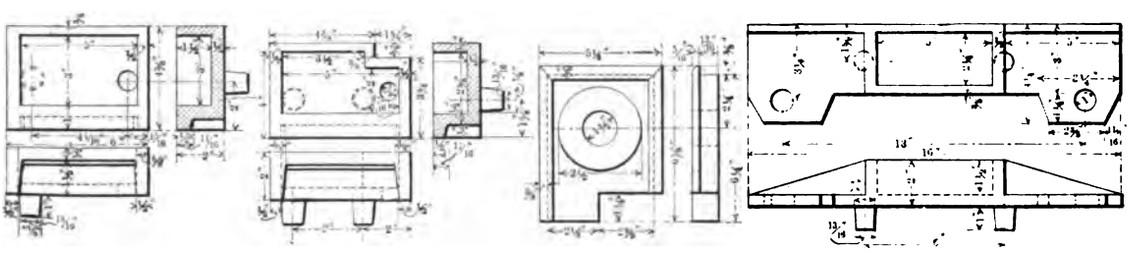
FIGS. 451-453. BRACE AND POST POCKET.

FIGS. 454-456. DOOR POST POCKET, TOP.

FIGS. 457-458. CORNER POST POCKET, BOTTOM.

FIGS. 459-460. CORNER POST AND BRACE POCKET.

FIGS. 461-462. TRUSS ROD WASHER.

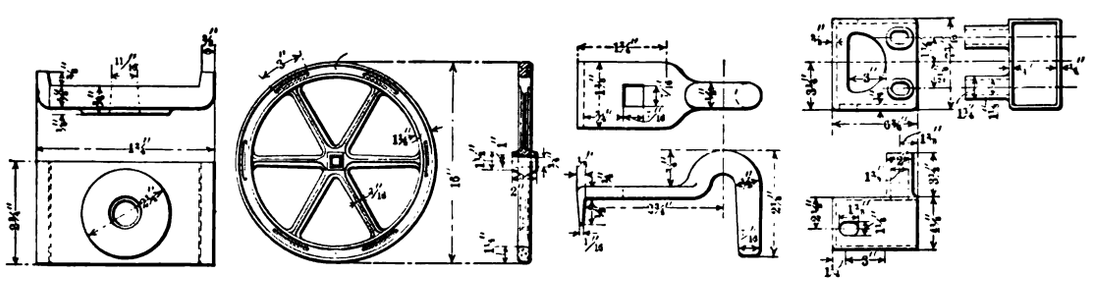


FIGS. 463-465. POST POCKET, BOTTOM.

FIGS. 466-468. DOOR POST POCKET, BOTTOM.

FIGS. 469-470. TRUSS ROD WASHER.

FIGS. 471-472. POST AND DOUBLE BRACE POCKET.

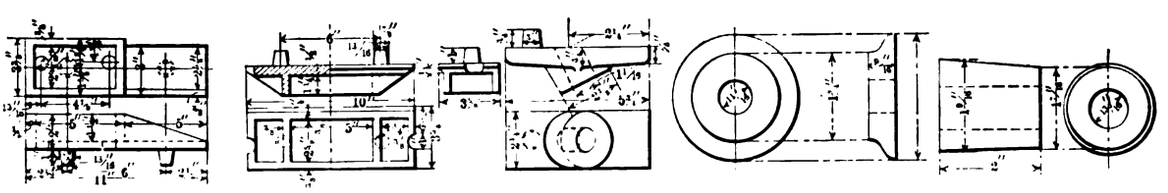


FIGS. 473-474. DOUBLE LIPPED WASHER.

FIGS. 475-476. BRAKE HAND WHEEL.

FIGS. 477-478. DOOR HASP STAPLE.

FIGS. 479-481. DRAWBAR FOLLOWER STOP.



FIGS. 482-483. SIDE POST AND BRACE POCKET.

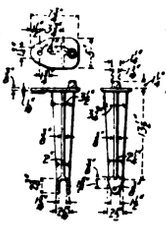
FIGS. 484-486. POST POCKET.

FIGS. 487-488. BRACE ROD WASHER.

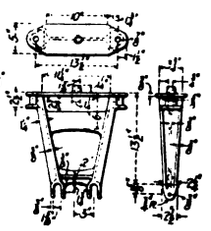
FIGS. 489-490. ⅝-IN. WASHER.

FIGS. 491-492. DRAFT SPRING THIMBLE.

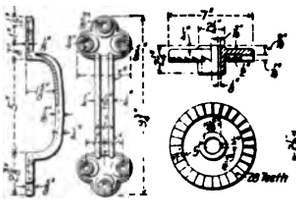
FIGS. 493-496. TOP BRAKE SHAFT BEARING WITH PAWL PIVOT.



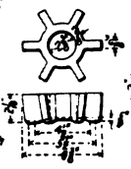
FIGS. 497-499. BODY TRUSS ROD BEARING, SINGLE.



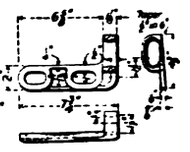
FIGS. 500-502. BODY TRUSS ROD BEARING DOUBLE.



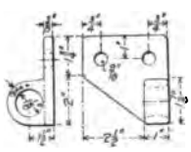
FIGS. 503-504. DOOR HANDLE. FIGS. 505-506. BRAKE RATCHET WHEEL.



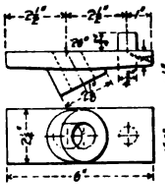
FIGS. 507-508. FILLING SPIDER.



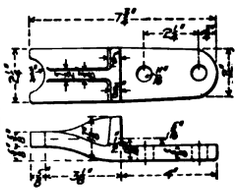
FIGS. 509-511. UNCOUPLING SHAFT CENTER BRACKET.



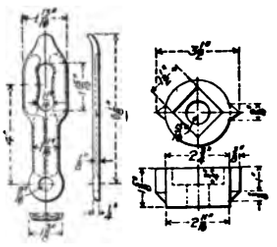
FIGS. 512-513. UNCOUPLING SHAFT END BRACKET.



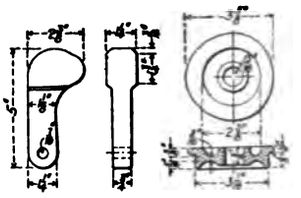
FIGS. 514-515. BRACE ROD WASHER.



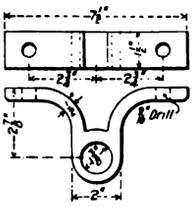
FIGS. 516-517. LOWER BRAKE SHAFT BEARING.



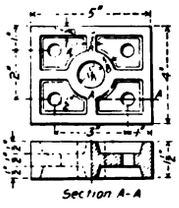
FIGS. 518-520. DOOR HASP. FIGS. 521-522. FLOOR WASHER.



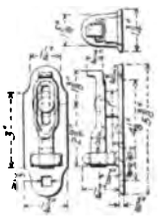
FIGS. 523-524. PAWL WEIGHT. FIGS. 525-526. DOOR HANGER SHEAVE.



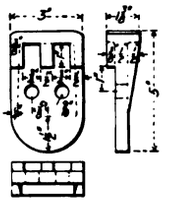
FIGS. 527-528. MIDDLE BRAKE SHAFT BEARING.



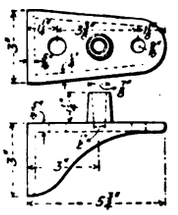
FIGS. 529-530. SILL TIMBER KEY.



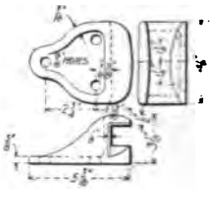
FIGS. 531-533. DOOR FASTENER.



FIGS. 534-536. DRAWBAR POCKET GUIDE.

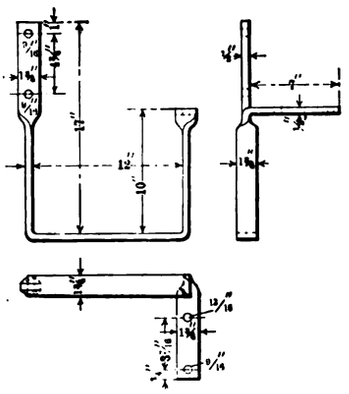


FIGS. 537-538. OPEN DOOR STOP.

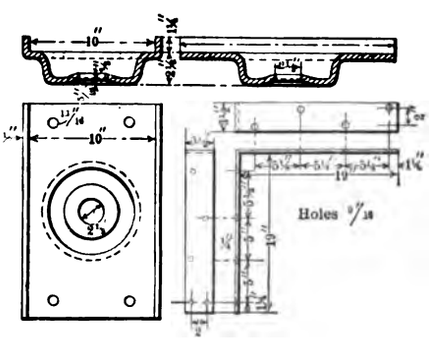


FIGS. 539-541. DOOR GUIDE BRACKET.

CAST AND MALLEABLE IRON DETAILS. 80,000 LB. BOX CAR. N. Y. C. & H. R.



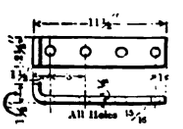
FIGS. 542-544. SILL STEP.



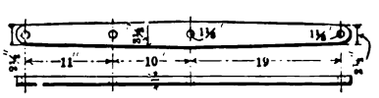
FIGS. 545-547. PRESSED STEEL CENTER PLATE.

FIGS. 548-550. OUTSIDE MIDDLE CORNER PLATE.

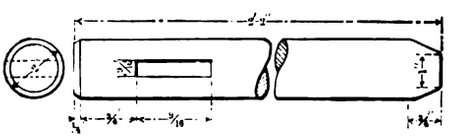
FIGS. 551-552. SPLIT KEY.



FIGS. 553-554. TRUSS ROD END PLATE.

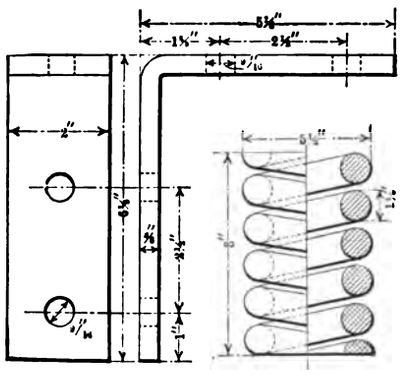


FIGS. 555-556. BRAKE CYLINDER LEVER.



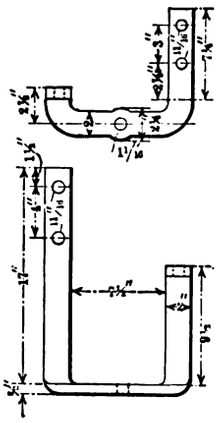
FIGS. 557-558. KING BOLT OR CENTER PIN.

FIGS. 559-560. 5/8-IN. LADDER ROUND.

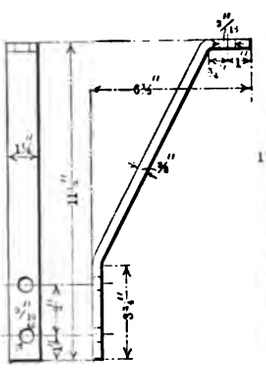


FIGS. 561-562. UPPER CORNER PLATE, INSIDE.

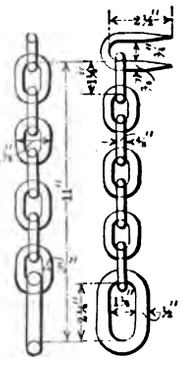
FIG. 563. 5½ IN. x 8 IN. SPIRAL SPRING.



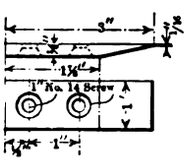
FIGS. 564-565. BRAKE SHAFT STEP.



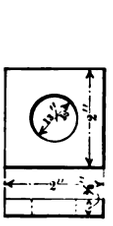
FIGS. 566-567. RUNNING BOARD EXTENSION BRACKET.



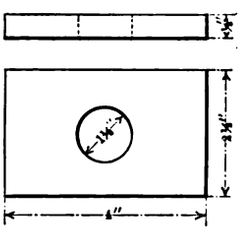
FIGS. 568-569. HAND BRAKE ROD SUPPORTING CHAIN.



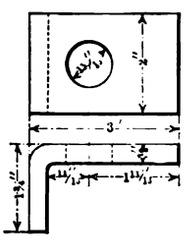
FIGS. 570-571. DOOR WEDGE.



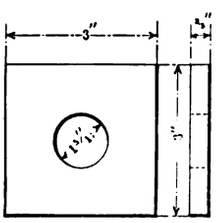
FIGS. 572-573. ¾-IN WASHER.



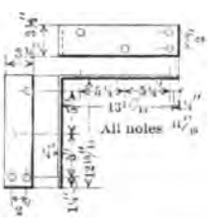
FIGS. 574-575. SILL AND PLATE ROD WASHER.



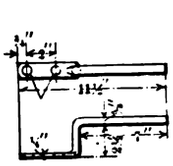
FIGS. 576-577. DISTANCE BLOCK. DRAWBAR POCKET GUIDE.



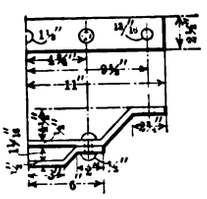
FIGS. 578-579. SQUARE WASHER.



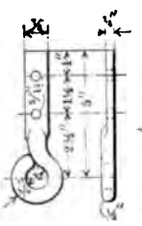
FIGS. 580-582. MIDDLE CORNER PLATE, INSIDE.



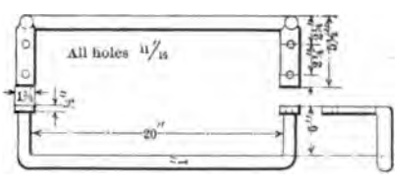
FIGS. 583-584. ROOF HAND HOLD.



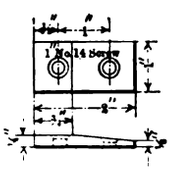
FIGS. 585-586. INTERMEDIATE BRAKE LEVER FULCRUM.



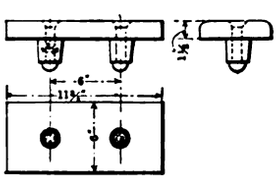
FIGS. 587-588. RELEASE VALVE ROD GUIDE.



FIGS. 589-591. BRAKE LEVER GUIDE.



FIGS. 592-593. DOOR WEDGE.



FIGS. 594-596. DRAWBAR FOLLOWER PLATE.

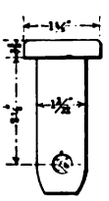
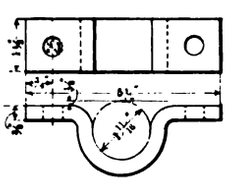
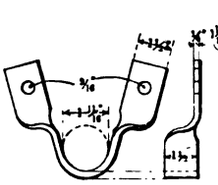


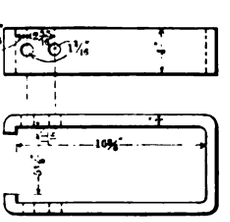
FIG. 597. BRAKE CONNECTION PIN.



FIGS. 598-599. PIPE CLAMP.



FIGS. 600-601. PIPE HANGER.



FIGS. 602-603. DRAWBAR YOKE.

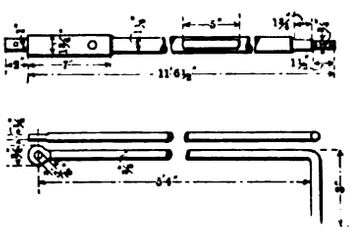
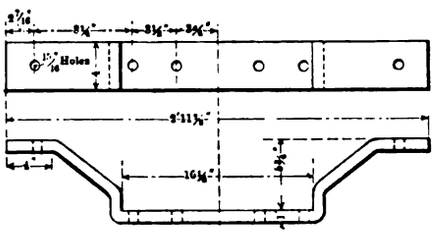
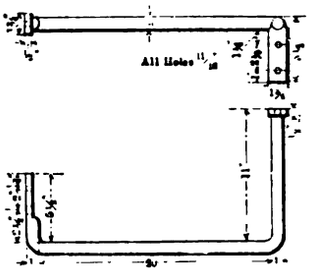


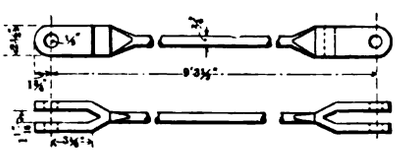
FIG. 604. BRAKE SHAFT.
FIGS. 605-606. RELEASE VALVE ROD.



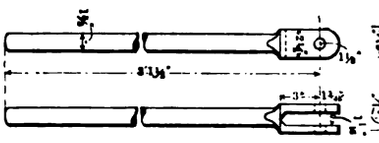
FIGS. 607-608. DRAWBAR CARRY IRON.



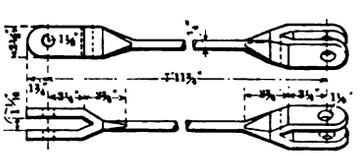
FIGS. 609-610. CYLINDER LEVER GUIDE.



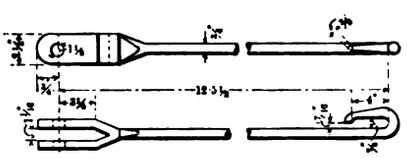
FIGS. 611-612.
BRAKE CONNECTION, CYLINDER LEVER.



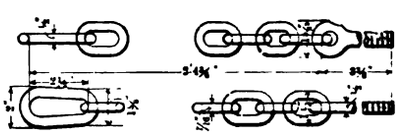
FIGS. 613-614.
PUSH ROD, AIR BRAKE CYLINDER.



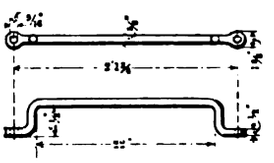
FIGS. 615-616. BRAKE CONNECTION, INTERMEDIATE TRUCK LEVERS.



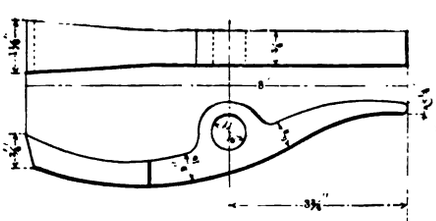
FIGS. 617-618.
HAND-BRAKE CONNECTION.



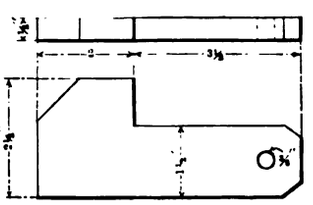
FIGS. 619-620.
HAND BRAKE CHAINS.



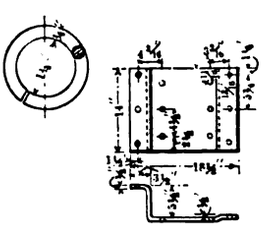
FIGS. 621-622.
HAND-HOLD.



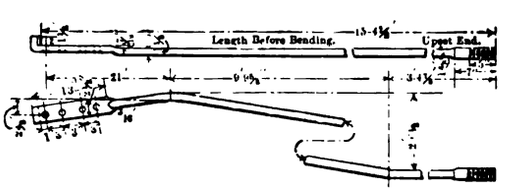
FIGS. 623-624. BRAKE PAWL.



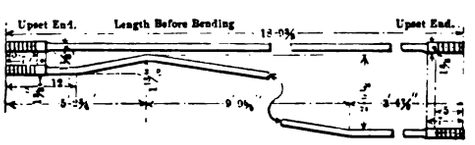
FIGS. 625-627. KING BOLT KEY AND RING.



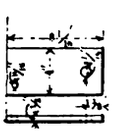
FIGS. 628-629.
BRAKE CYLINDER PLATE.



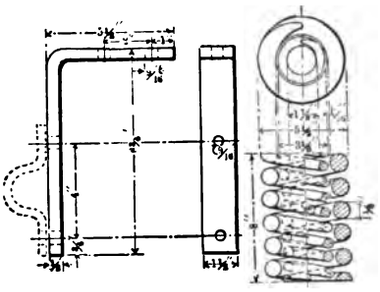
FIGS. 630-631. BODY TRUSS ROD, UPSET AND STRAP ENDS.



FIGS. 632-633. BODY TRUSS ROD, UPSET ENDS.



FIGS. 634-635.
LOWER GUIDE FOR DRAWBAR FOLLOWER.



FIGS. 636-637. PIPE CLAMP BRACKET.

FIGS. 638-639. DOUBLE SPIRAL SPRING.

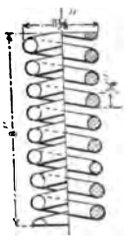
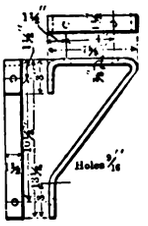
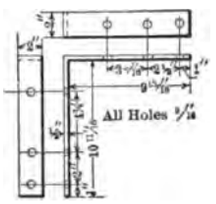


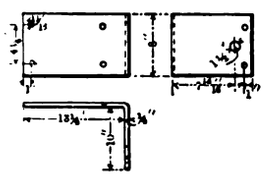
FIG. 640. SPIRAL SPRING.



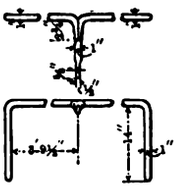
FIGS. 641-643. BRAKE STEP BRACKET.



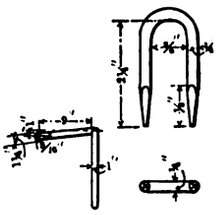
FIGS. 644-666. UPPER CORNER PLATE, OUTSIDE.



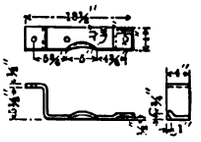
FIGS. 647-649. LOWER CORNER PLATE, OUTSIDE.



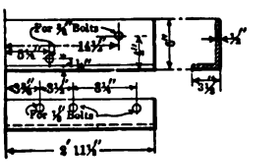
FIGS. 650-652. UNCOUPLING ROD.



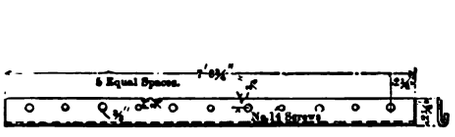
FIGS. 653-654. STAPLE.



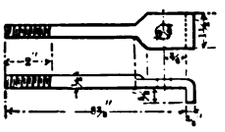
FIGS. 655-657. BRAKE RESERVOIR PLATE.



FIGS. 658-660. BUFFER BLOCK ANGLE.



FIGS. 661-663. REAR SHEATH FOR SECURITY DOOR.



FIGS. 664-665. ½-IN. STRAP BOLT.

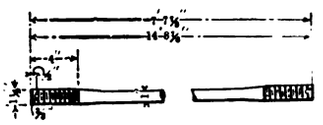


FIG. 666. 1 IN. DRAFT ROD.

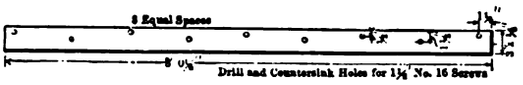
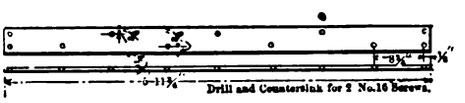


FIG. 667. DOOR POST PLATE.



FIGS. 668-669. DOOR THRESHOLD PLATE.

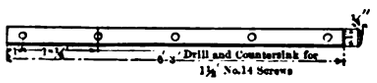
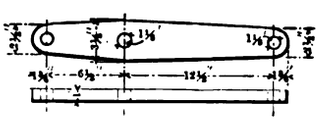


FIG. 670. DOOR CHAFING STRIP.



FIGS. 671-672. BRAKE INTERMEDIATE LEVER.

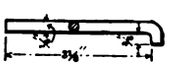
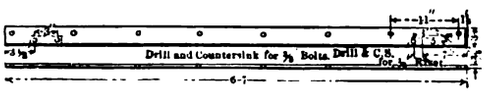


FIG. 673. JAW KEY, TRUSS ROD BEARING.



FIGS. 674-675. DOOR GUIDE PLATE, BOTTOM.

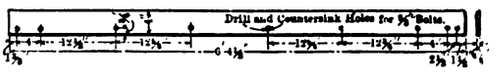
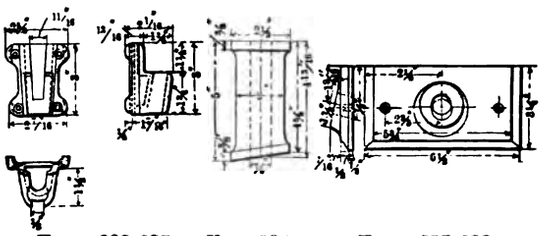
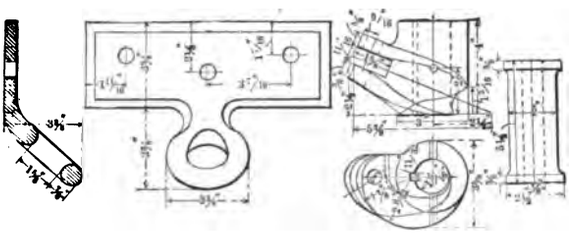


FIG. 676. DOOR GUIDE PLATE, TOP.

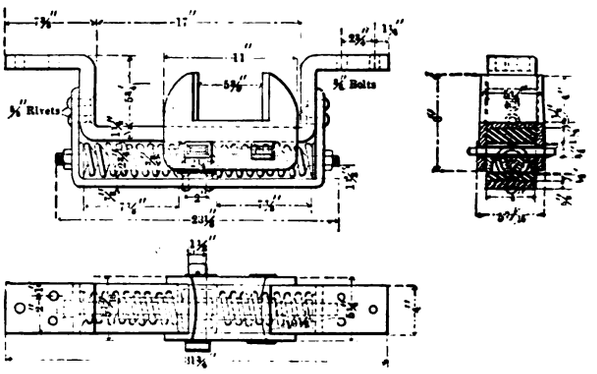
FIGS. 677-678. CAP SOCKET WASHER. FIG. 679. CENTER PIN FLOOR PLATE. FIGS. 680-682. PIPE CLAMP.



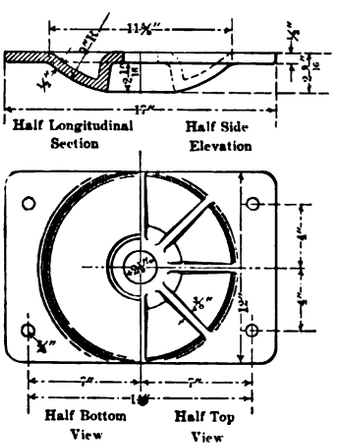
FIGS. 683-685. CORNER POST SIGNAL BRACKET. FIG. 686. BOLSTER THIMBLE. FIGS. 687-688. NEEDLE BEAM END PLATE.



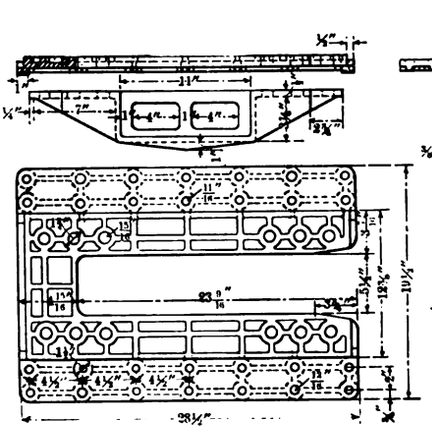
FIGS. 689-690. BODY, TRUCK SAFETY CHAIN EYE. FIGS. 691-692. HAND BRAKE WORM. FIG. 693. BOLSTER THIMBLE.



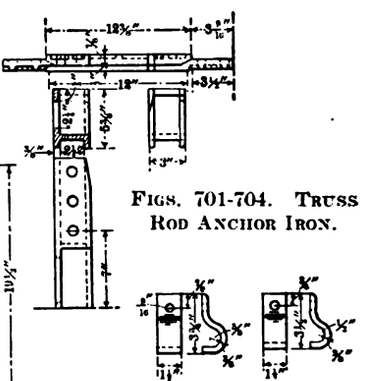
FIGS. 694-696. COUPLER STIRRUP.



FIGS. 697-698. BODY CENTER PLATE.

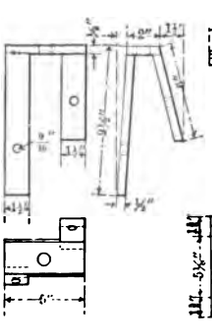


FIGS. 699-700. DRAFT SPRING POCKET.

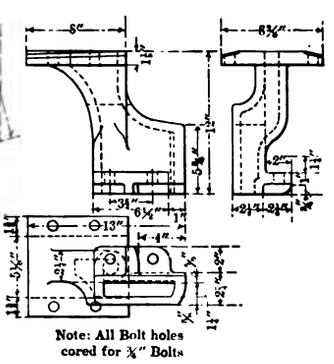


FIGS. 701-704. TRUSS ROD ANCHOR IRON.

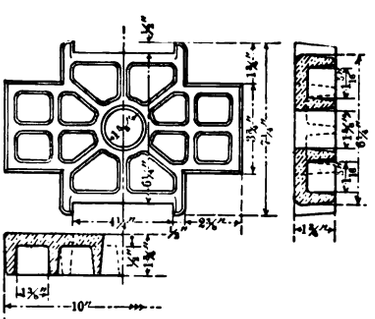
FIGS. 705-708. PIPE CLAMPS.



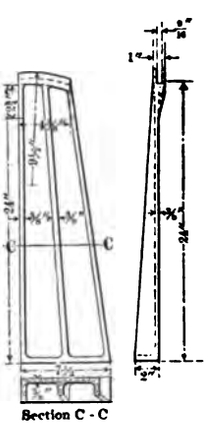
FIGS. 709-711. PIPE HANGER.



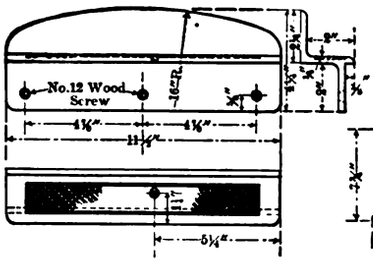
FIGS. 712-714. COUPLER GUIDE.



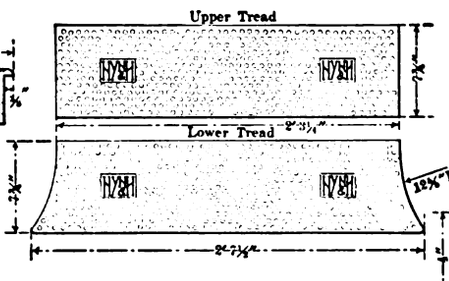
FIGS. 715-717. COUPLER FOLLOWER PLATE.



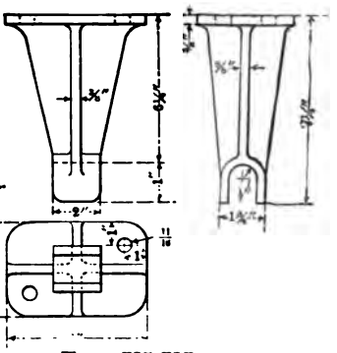
FIGS. 718-720. OVERHANG TRUSS ROD STRUT.



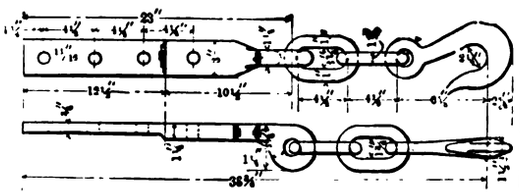
FIGS. 721-722.
FOOT BRACKET FOR SEAT END.



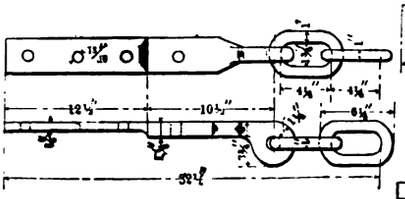
FIGS. 723-724.
STEP TREADS.



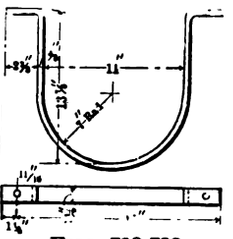
FIGS. 725-727.
BODY TRUSS ROD QUEEN POST.



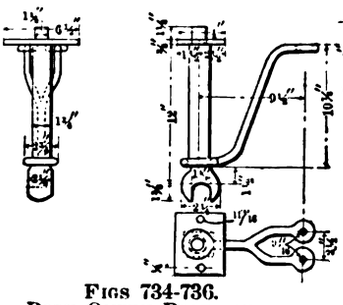
FIGS. 728-729.
PLATFORM SAFETY CHAIN WITH HOOK.



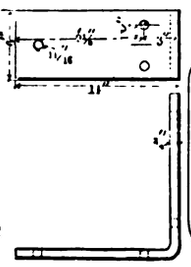
FIGS. 730-731.
PLATFORM SAFETY CHAIN.



FIGS. 732-733.
AUXILIARY RESERVOIR HANGER.



FIGS 734-736.
BODY QUEEN POST AND BRACE.



FIGS 737-738.
SILL CORNER IRON.

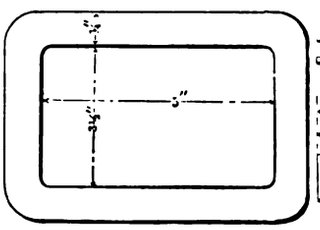
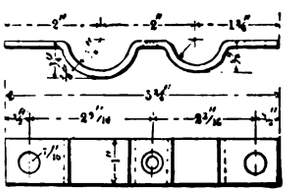
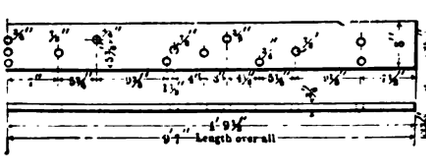


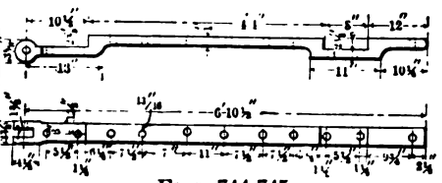
FIG. 739.
FLOATING LEVER HANGER.



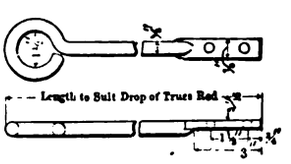
FIGS. 740-741.
PIPE STRAP.



FIGS. 742-743.
END SILL PLATE.



FIGS. 744-745.
TRUSS ROD ANCHOR IRON.



FIGS. 746-747.
TRUSS ROD SAFETY HANGERS.

FIGS. 748-749.
CYLINDER LEVER GUIDE.

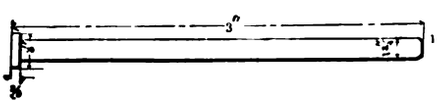
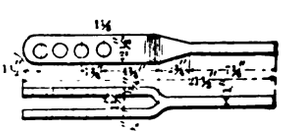
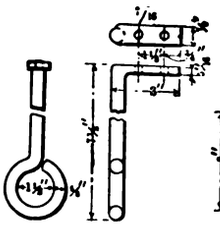


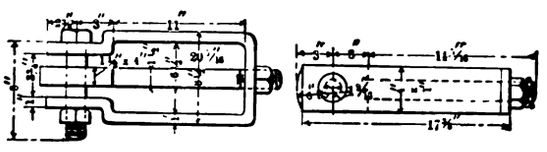
FIG. 750.
CENTER PIN.



FIGS. 751-752.
BRAKE CONNECTION JAWS.



FIGS. 753-755.
TRUSS ROD SAFETY HANGER.



FIGS 756-757.
DRAFT YOKE, DRAFT BOLT AND TAIL PIN.

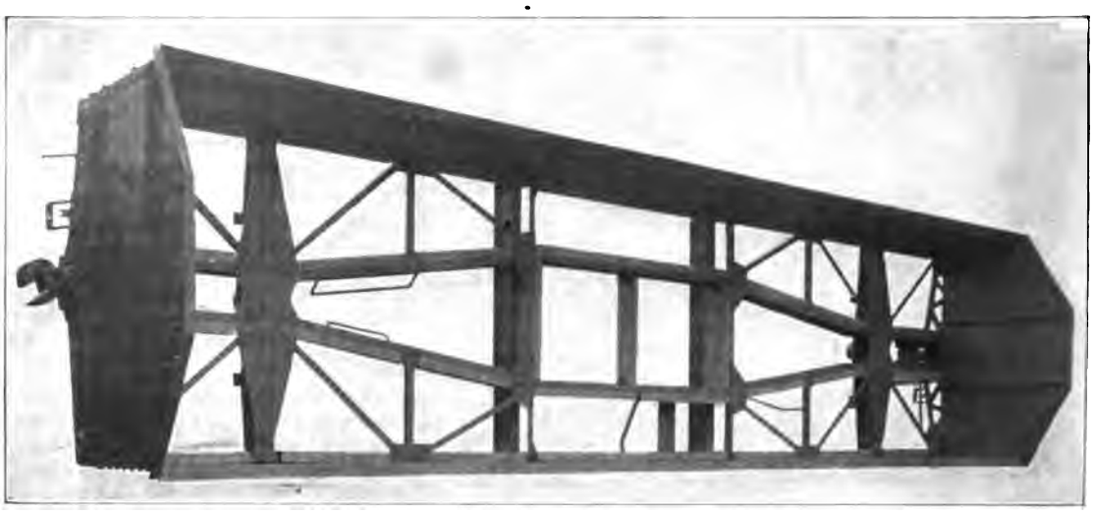


FIG. 758. PERSPECTIVE VIEW OF STRUCTURAL STEEL FRAMING FOR 100,000 LB. CAPACITY DROP BOTTOM GONDOLA CAR. AMERICAN CAR & FOUNDRY CO., BUILDERS.

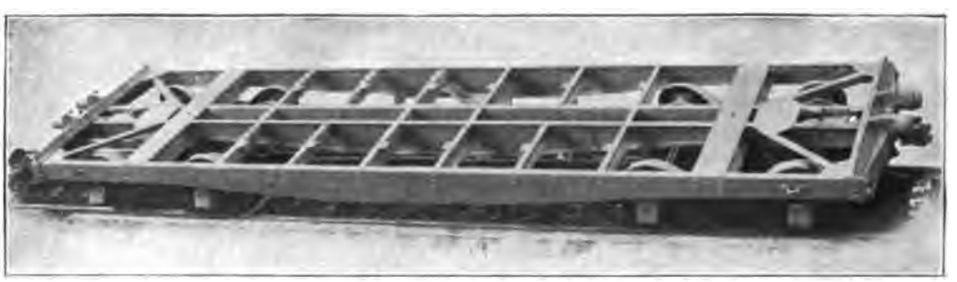
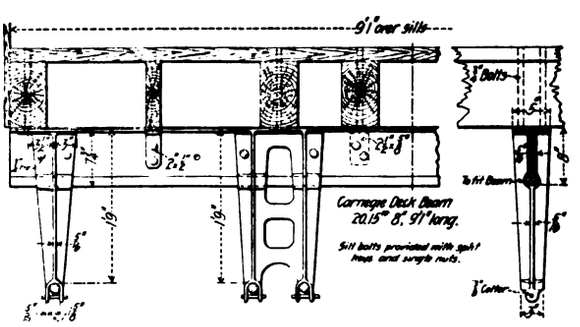
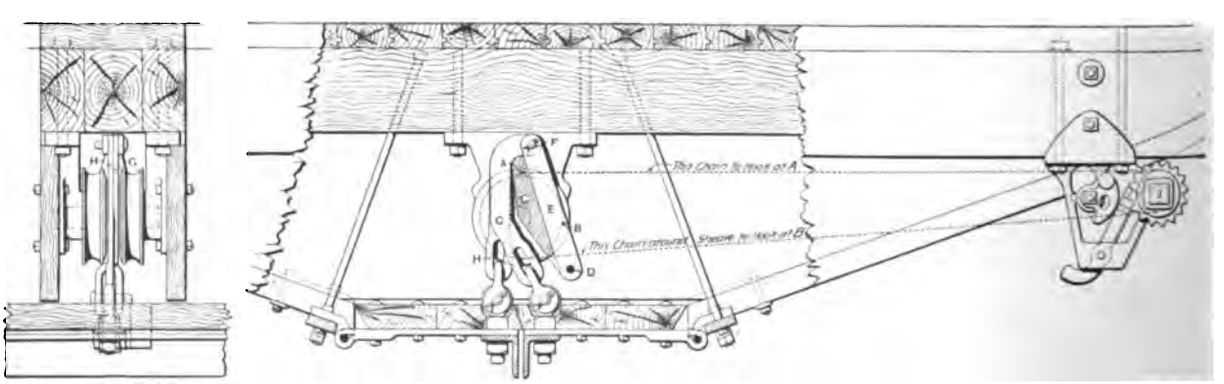


FIG. 759. PERSPECTIVE VIEW OF PRESSED STEEL UNDERFRAME FOR 100,000 LB. CAPACITY, BOX CAR. PRESSED STEEL CAR CO., BUILDERS.



FIGS. 760-761. DETAIL OF DECK BEAM CROSS TIE, OR NEEDLEBEAM. C., B. & Q. 80,000 LB. CAPACITY. BOX CAR.



FIGS. 762-763. DETAILS OF SIMONTON DROP DOOR FOR GONDOLA CARS.

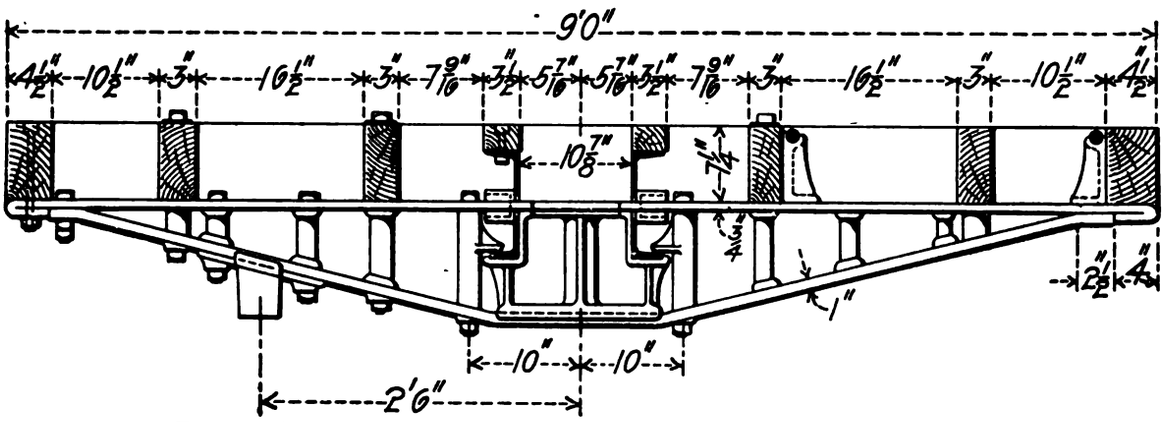
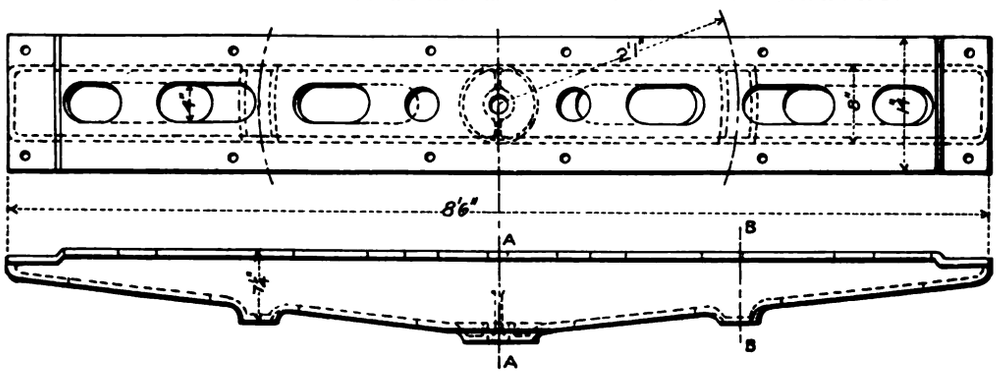
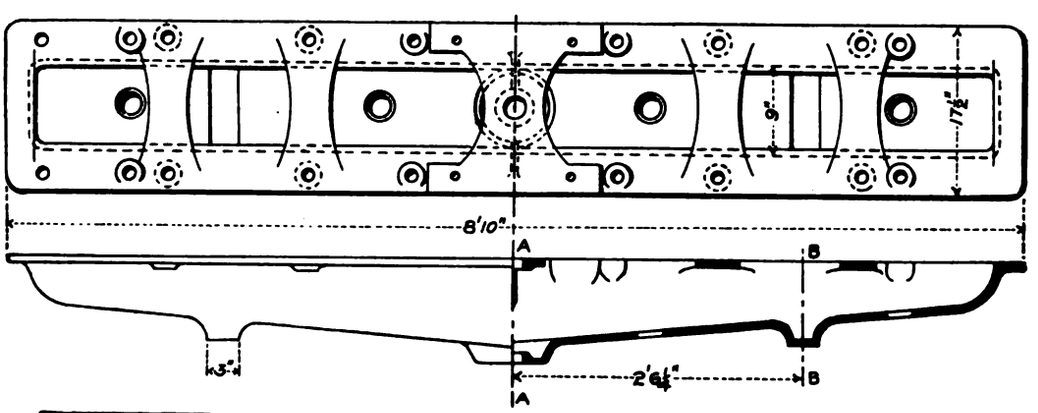


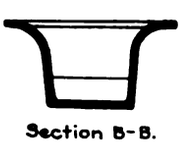
FIG. 764. METAL BOLSTER FOR BOX CAR. CAPACITY, 60,000 LBS. C., M. & ST. P.

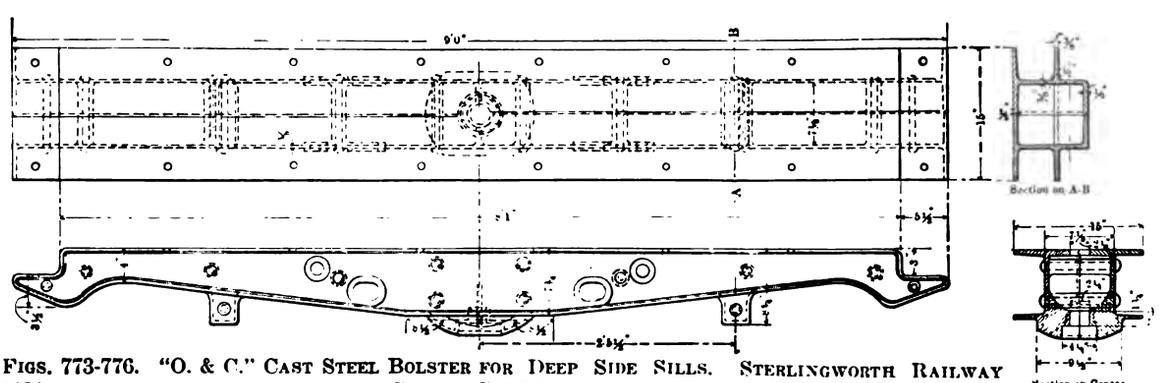


FIGS. 765-768. KEYSTONE CAST STEEL BOLSTER, BOX SECTION. AMERICAN STEEL FOUNDRIES, MAKERS.

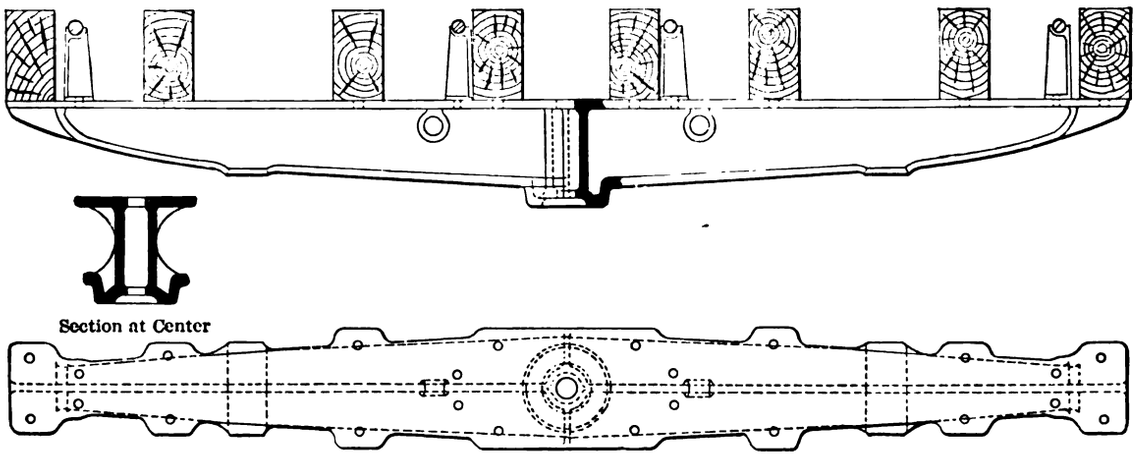


FIGS. 769-772. KEYSTONE CAST STEEL BOLSTER, CHANNEL SECTION. AMERICAN STEEL FOUNDRIES, MAKERS.

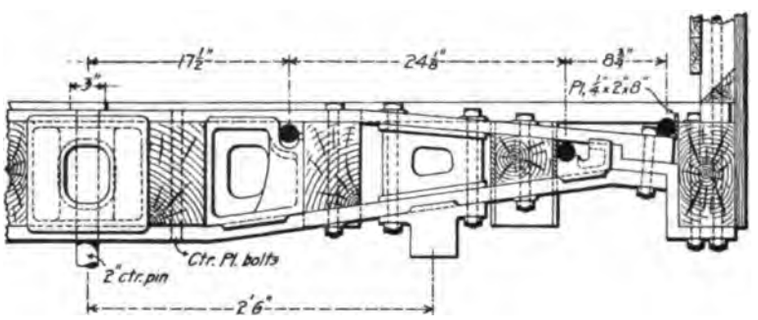


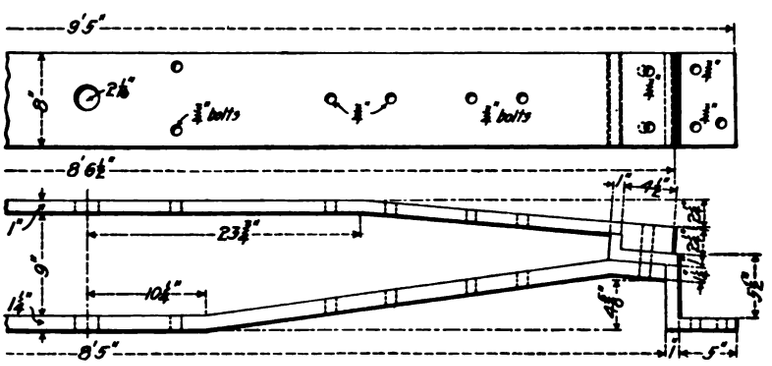


FIGS. 773-776. "O. & C." CAST STEEL BOLSTER FOR DEEP SIDE SILLS. STERLINGWORTH RAILWAY SUPPLY CO., MAKERS.

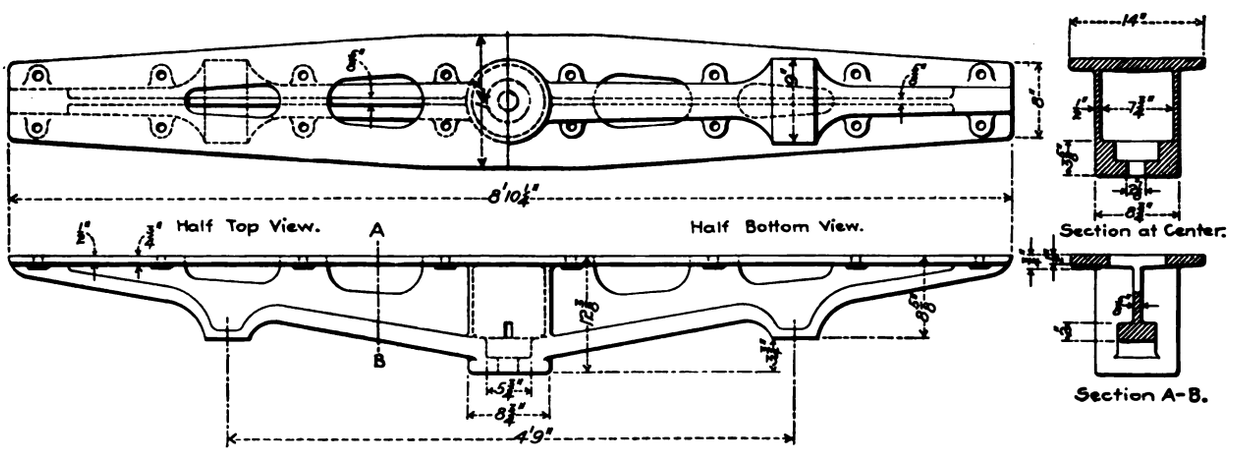


FIGS. 777-779. CAST STEEL BOLSTER, I BEAM SECTION. AMERICAN STEEL FOUNDRIES, MAKERS.

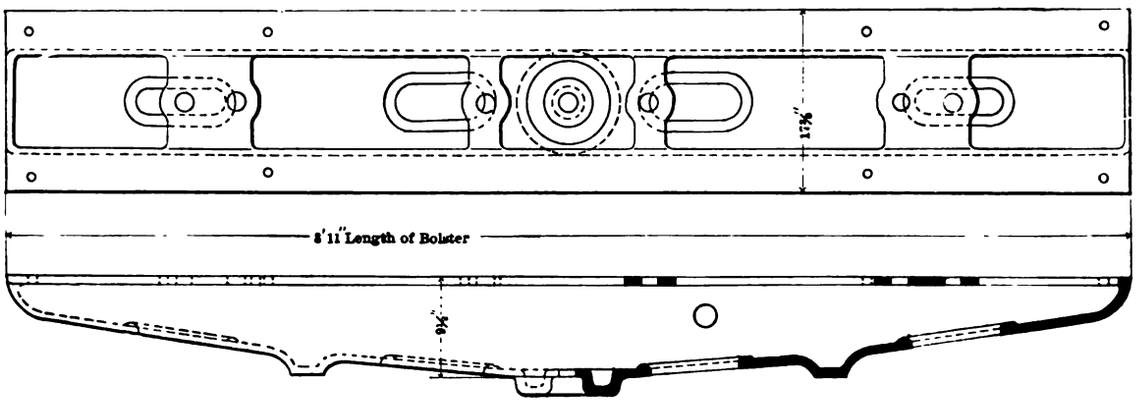




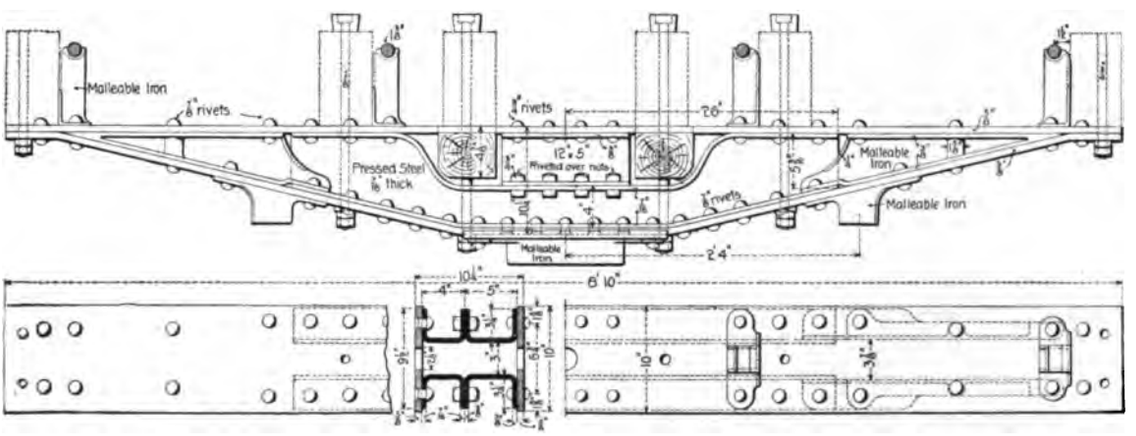
FIGS. 780-782. METAL BOLSTER FOR 50-FT. FURNITURE CAR. B. & O.



FIGS. 783-786. CAST STEEL BOLSTER. 60,000-LB. BOX CAR. MO. PAC.
COMMONWEALTH STEEL CO., MAKERS.



FIGS. 787-788. CAST STEEL BOLSTER. AMERICAN STEEL FOUNDRIES, MAKERS.



FIGS. 789-791. METAL BOLSTER FOR BOX CAR, 70,000 LBS. CAPACITY. NOR. PAC.

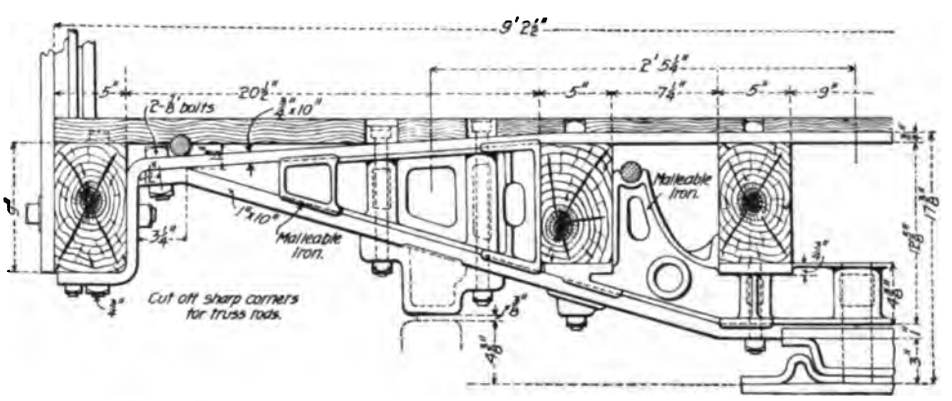


FIG. 792. METAL BOLSTER FOR 50-FT. FURNITURE CAR WITH DEEP SIDE SILLS. C., R. I. & P.

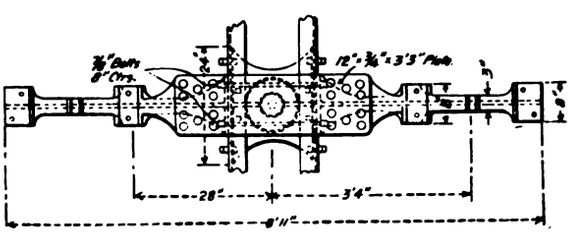


FIG. 793. PLAN.

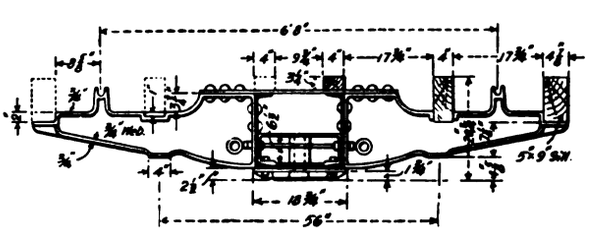
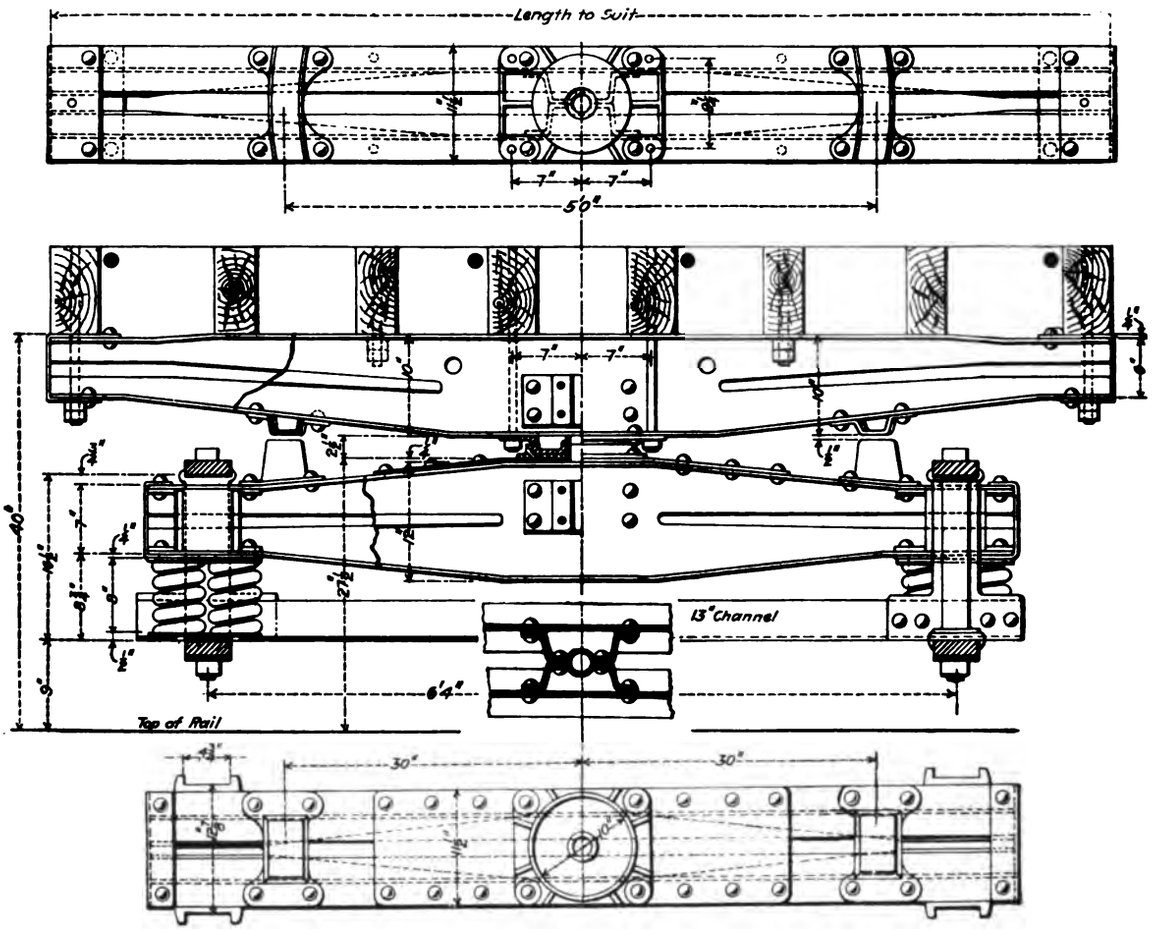
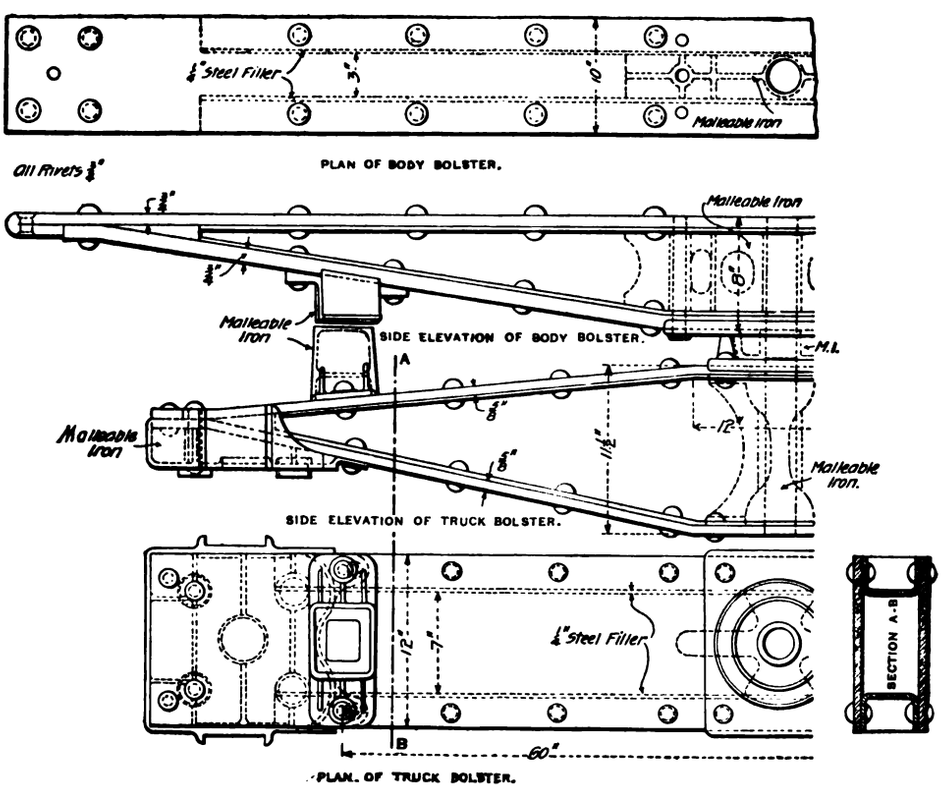


FIG. 794. SIDE ELEVATION.

TWO-PIECE, CAST STEEL BOLSTER FOR 80,000-LB. BOX CAR WITH CHANNEL CENTER SILLS. A., T. & S. F.



Figs. 795-798. Bettendorf, I Beam, Body and Truck Bolsters for 80,000-Lb. Capacity Cars.
Bettendorf Axle Co., Makers.



Figs. 799-802. "Common Sense" Body and Truck Bolsters for 80,000-Lb. Capacity Car.

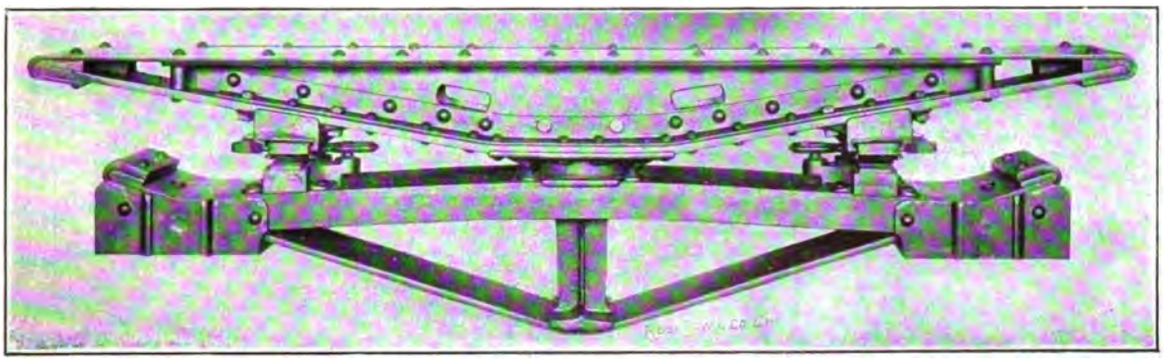
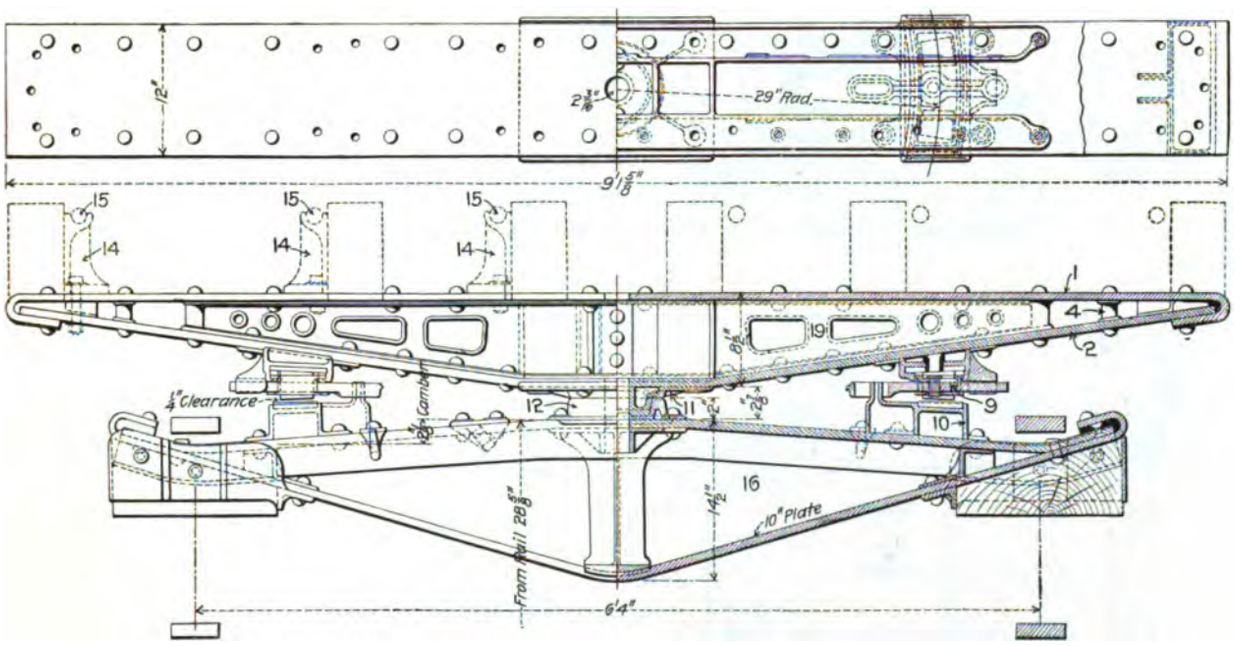
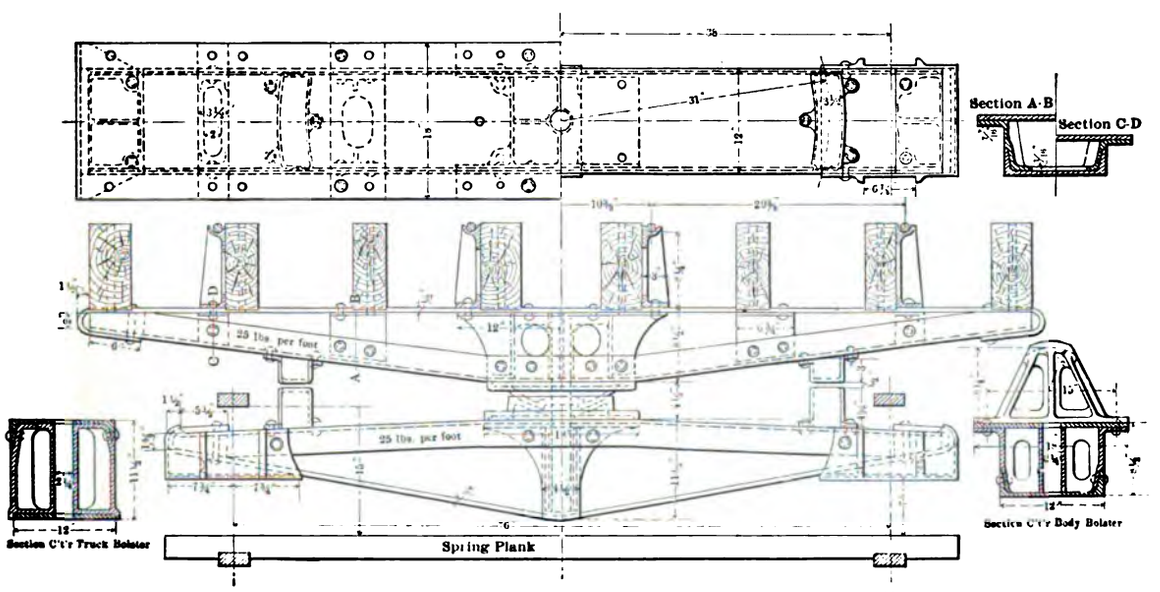


Fig. 803. Simplex Body and Truck Bolsters with Susemihl Roller Side Bearings.
Simplex Railway Appliance Co., Makers.

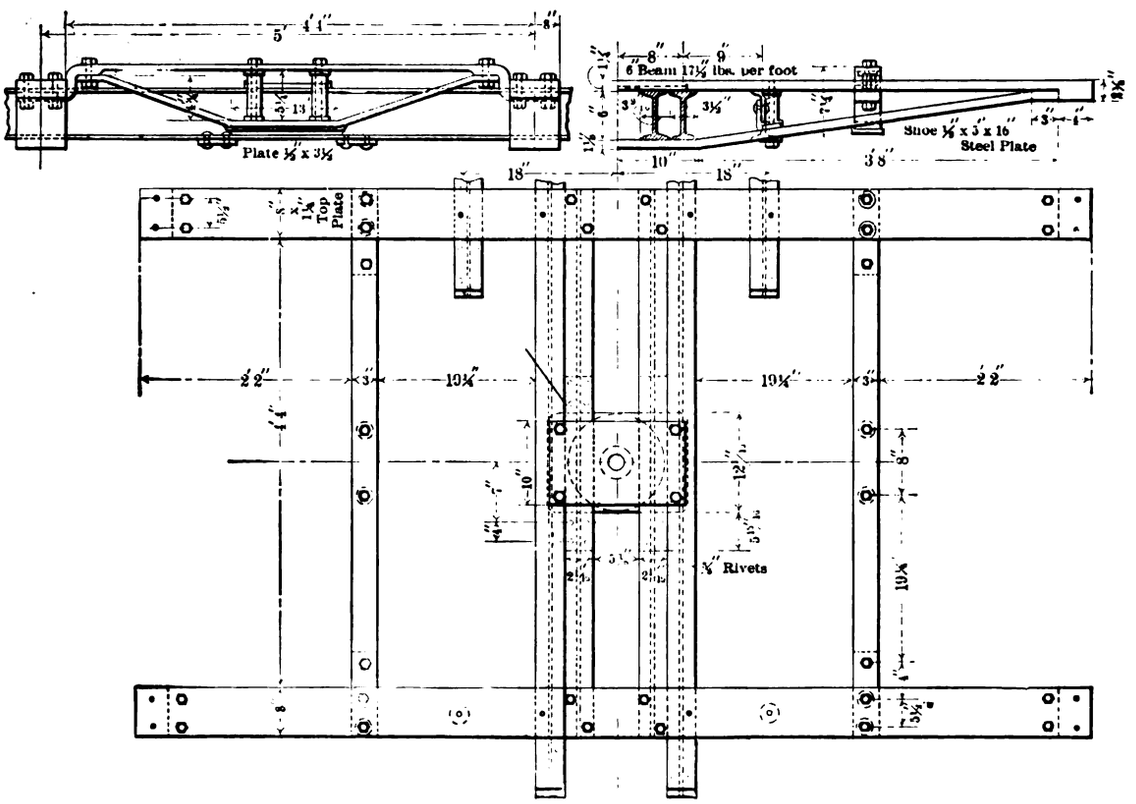
Numbers Refer to List of Names with Figs. 811-820.



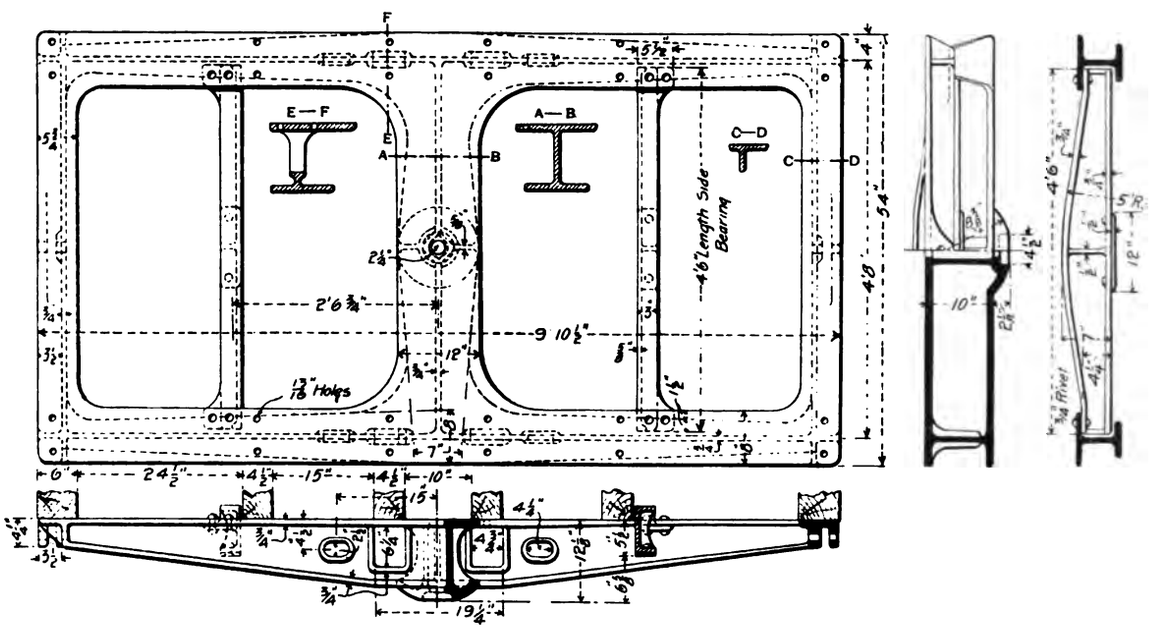
Figs. 804-805. Simplex Body and Truck Bolsters with Susemihl Roller Side Bearings.
Simplex Railway Appliance Co., Makers.



Figs. 806-810. Sterlingworth Body and Truck Bolsters. 80,000 lbs. Capacity Cars.
Sterlingworth Railway Supply Co., Makers.



FIGS. 811-813. DOUBLE BODY BOLSTER. N. Y., N. H. & H.

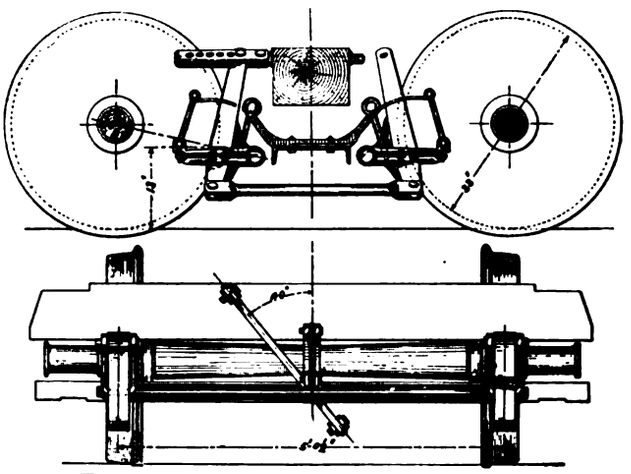


FIGS. 814-820. ONE PIECE CAST STEEL DOUBLE BODY BOLSTER.
AMERICAN STEEL FOUNDRIES, MAKERS.

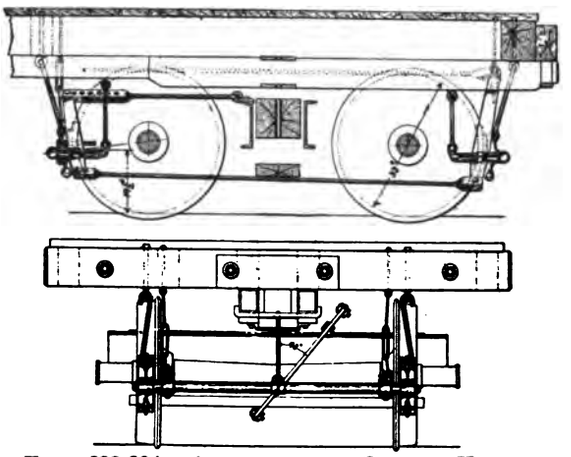
NAMES OF PARTS OF BOLSTERS. FIGS. 804-805.

1. *Top Plate of Body Bolster*
2. *Bottom Plate of Body Bolster*
4. *Thimble*
9. *Body Side Bearing*
10. *Truck Side Bearing*
11. *Body Center Plate*
12. *Truck Center Plate*
14. *Body Truss Rod Saddle*
15. *Body Truss Rod*
16. *Truck Bolster*
19. *Filling Spider*

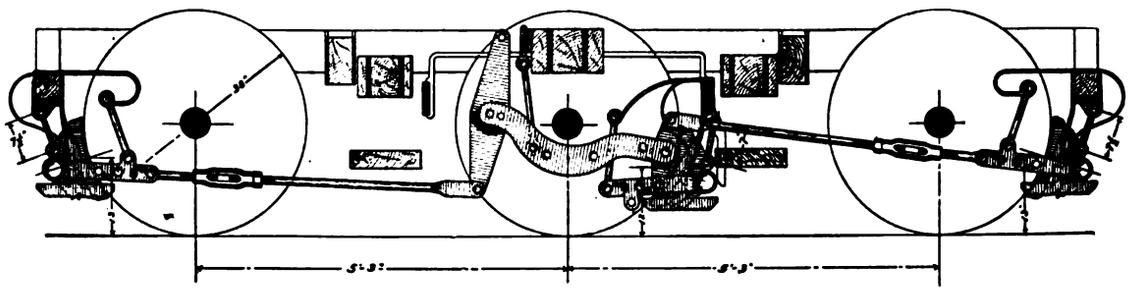
OTHER TYPES OF BOLSTERS ARE SHOWN UNDER TRUCKS.

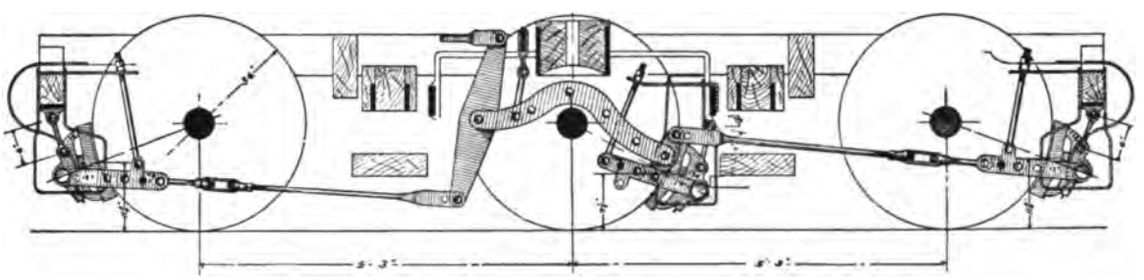


FIGS. 821-822. APPLICATION OF INSIDE HUNG BRAKE BEAM TO RIGID DIAMOND FREIGHT TRUCK.

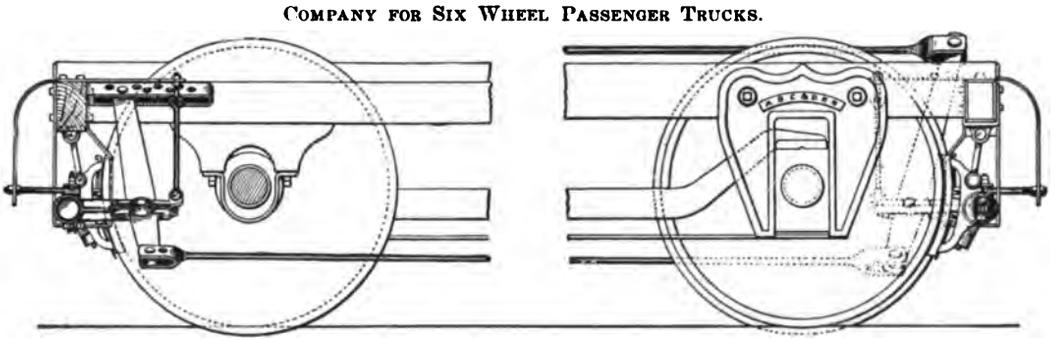


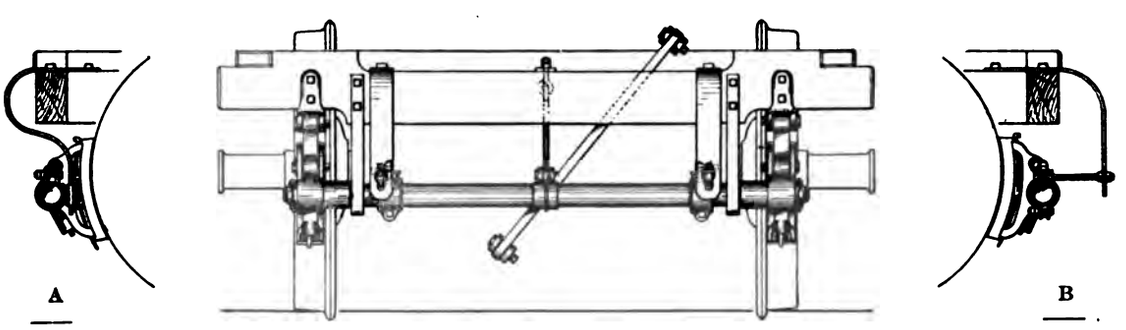
FIGS. 823-824. APPLICATION OF OUTSIDE HUNG BRAKE BEAM. BEAM HUNG FROM CAR BODY WITH POT HOOK HANGERS.





FIGS. 825-826. ARRANGEMENT OF BRAKE RIGGING FOR TRIPLE BRAKES AS USED BY THE PULLMAN COMPANY FOR SIX WHEEL PASSENGER TRUCKS.





FIGS. 827-831. APPLICATION OF ADJUSTABLE SPRING HEAD BEAM TO FOUR WHEEL PASSENGER TRUCK. A, shows Old Style Release Spring. B, shows Adjustable Release Spring.

RECOMMENDED BY THE CHICAGO RAILWAY EQUIPMENT CO.

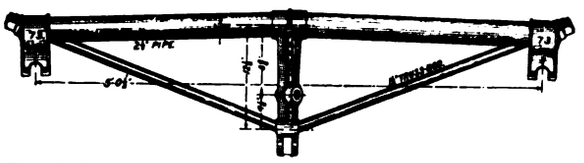


FIG. 832. NATIONAL HOLLOW. SPECIAL 2½ IN. BEAM WITH RIGID HEADS FOR 100,000 LBS. CARS.

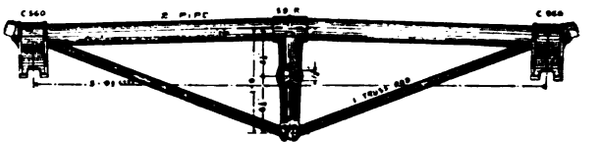


FIG. 833. NATIONAL HOLLOW, STANDARD 2 IN. FREIGHT BEAM WITH HEAD FOR LOOP HANGERS.

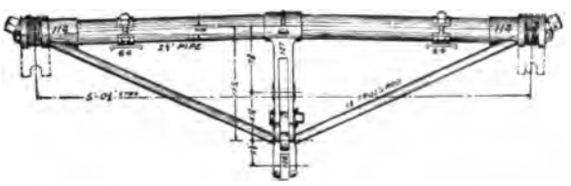


FIG. 834. NATIONAL HOLLOW, STANDARD TRIPLE BEAM FOR SIX WHEEL TRUCKS. SHOWN WITHOUT HEADS.

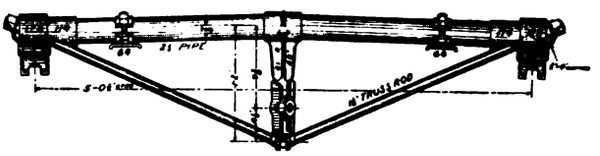


FIG. 835. NATIONAL HOLLOW, AUTOMATIC ADJUSTABLE SPRING HEAD, 2½ IN. BEAM FOR FOUR WHEEL PASSENGER TRUCKS.

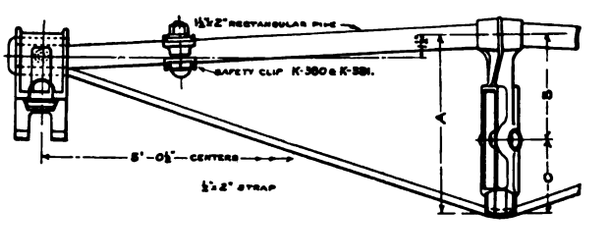


FIG. 836. KEWANEE FREIGHT BEAM WITH RIGID STRUT AND CLIPS.

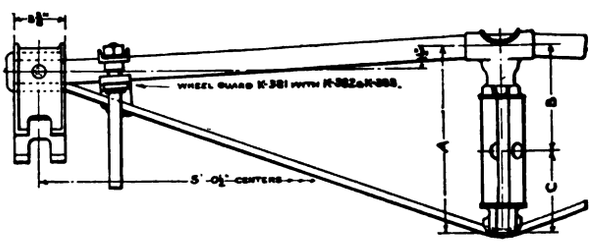
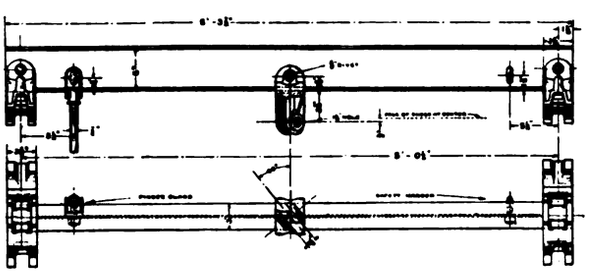
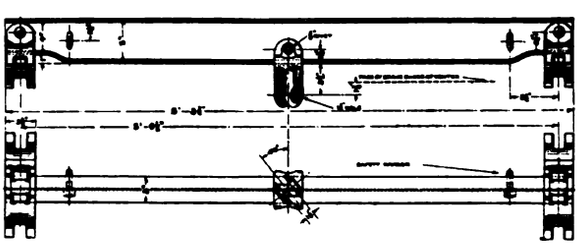


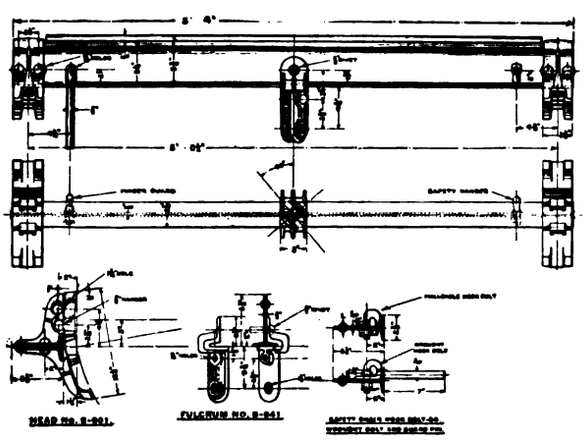
FIG. 837. KEWANEE FREIGHT BEAM WITH REVERSIBLE STRUT AND WHEEL GUARDS.



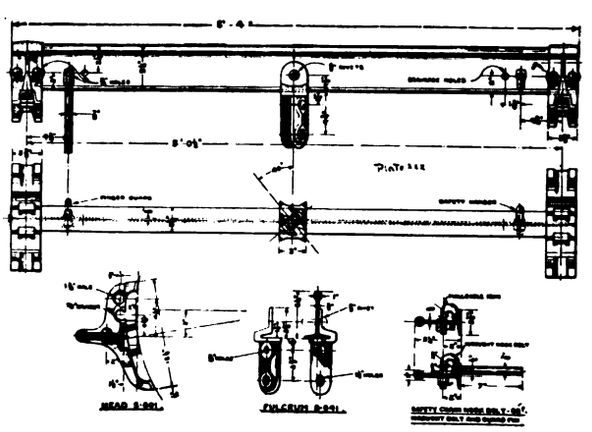
FIGS. 838-839. STANDARD MONARCH SOLID FREIGHT BEAM.



FIGS. 840-841. MONARCH SOLID FREIGHT BEAM WITH COMPRESSED ENDS.



FIGS. 842-846. STERLINGWORTH REINFORCED BRAKE BEAM FOR PASSENGER SERVICE.



FIGS. 847-851. STANDARD STERLINGWORTH BRAKE BEAM.

BRAKE BEAMS MADE BY THE CHICAGO RAILWAY EQUIPMENT CO.

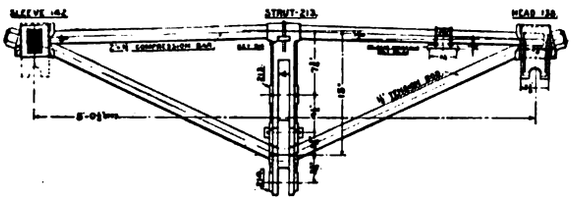


FIG. 852. DIAMOND SPECIAL, TRIPLE BRAKE BEAM FOR SIX WHEEL TRUCKS AND HIGH SPEED BRAKES.

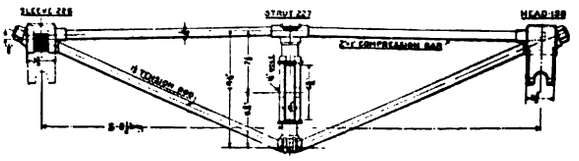
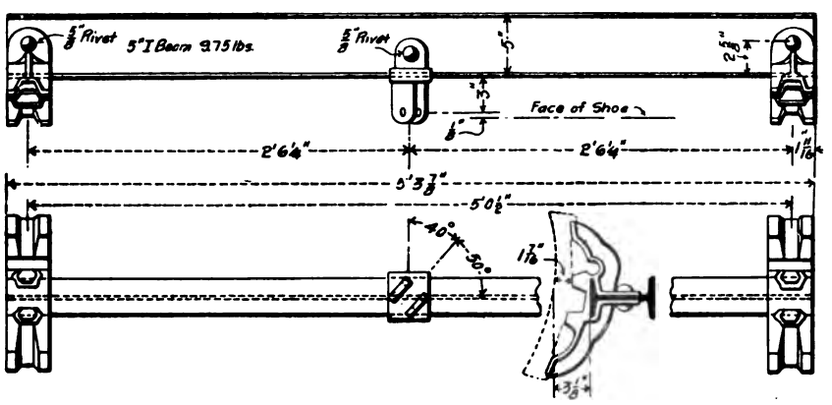
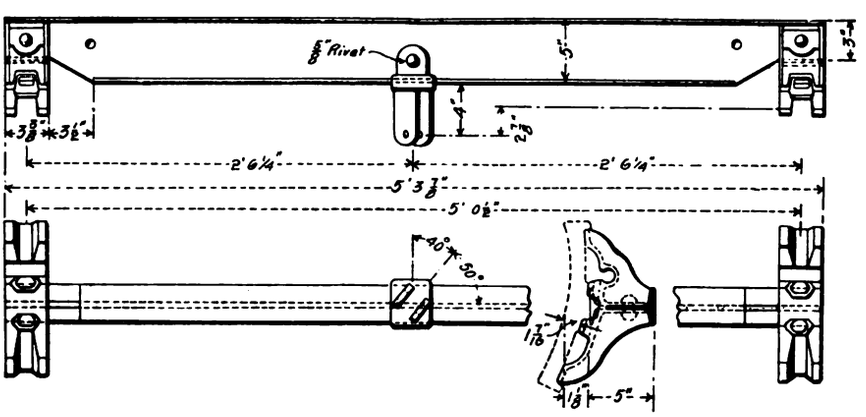


FIG. 853. DIAMOND ADJUSTABLE, BRAKE BEAM FOR HEAVY FREIGHT SERVICE.

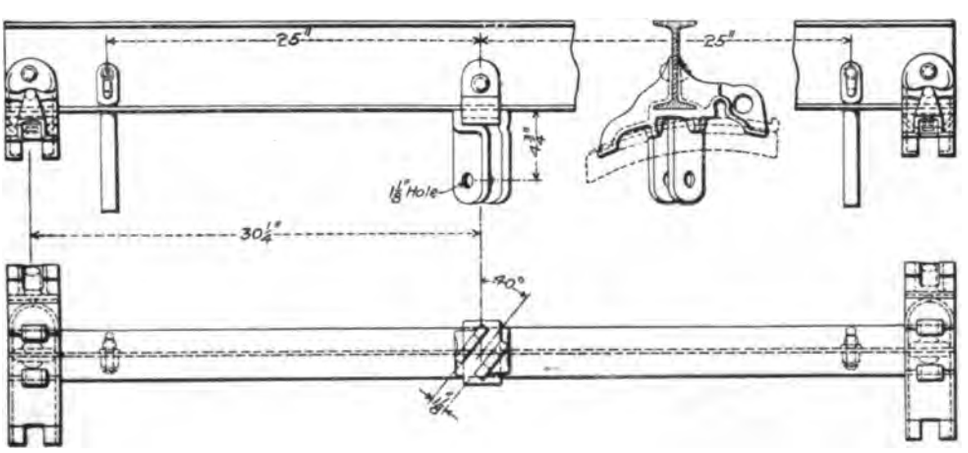
CHICAGO RAILWAY EQUIPMENT CO., MAKERS.



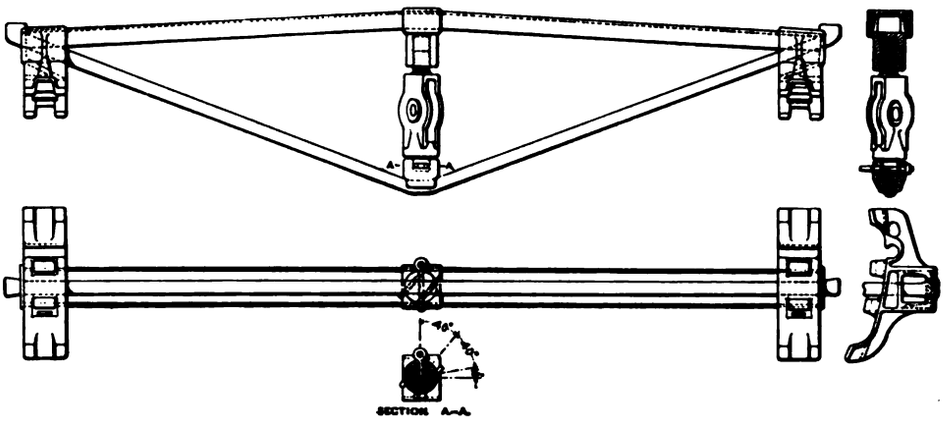
FIGS. 854-856. VANDERBILT BRAKE BEAM.
BUFFALO BRAKE BEAM CO.



FIGS. 857-859. VANDERBILT BRAKE BEAM WITH CUT OUT ENDS.
BUFFALO BRAKE BEAM CO.



FIGS. 860-862. SIMPLEX BRAKE BEAM.
SIMPLEX RAILWAY APPLIANCE CO.



FIGS. 863-867. VANDERBILT BRAKE BEAM. BUFFALO BRAKE BEAM CO.

FIG. 868. SIMPLEX BRAKE BEAM. SIMPLEX RAILWAY APPLIANCE CO.

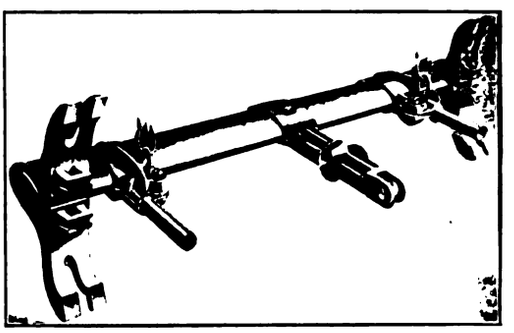
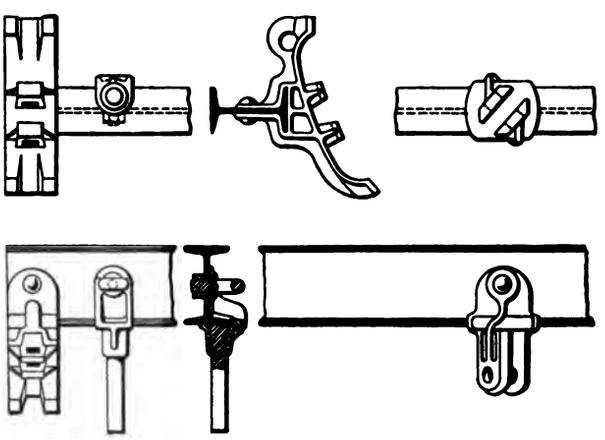
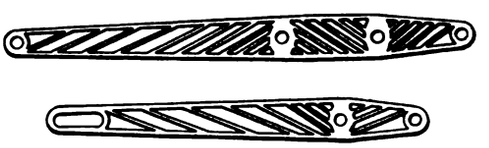


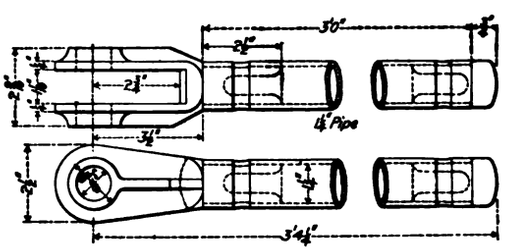
FIG. 869. OVAL BRAKE BEAM. ALLISON MANUFACTURING CO.



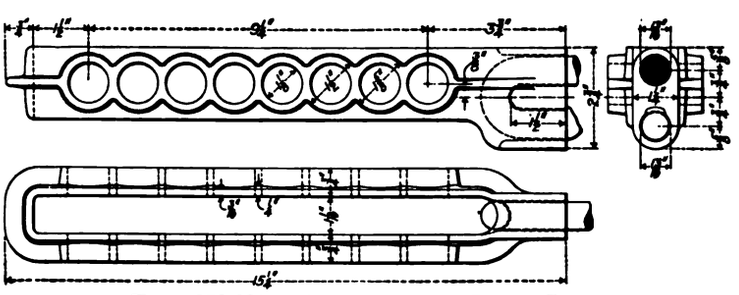
FIGS. 870-873. DAMASCUS BRAKE BEAM. DAMASCUS BRAKE BEAM CO.



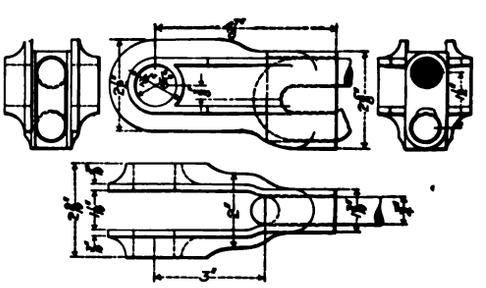
FIGS. 874-875. MALLEABLE IRON BRAKE LEVERS. DAYTON MALLEABLE IRON CO.



FIGS. 876-877. NATIONAL PUSH ROD END. THE NATIONAL MALLEABLE CASTINGS CO.



FIGS. 878-880. NATIONAL DEAD LEVER GUIDE. MALLEABLE IRON.



FIGS. 881-884. NATIONAL BRAKE JAW. MALLEABLE IRON.

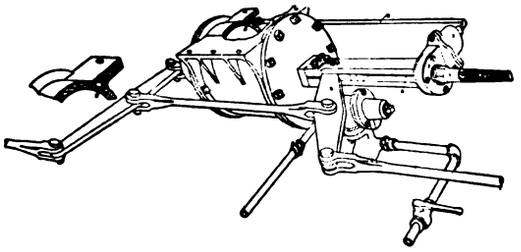


Fig. 885. Applied to Passenger Car.

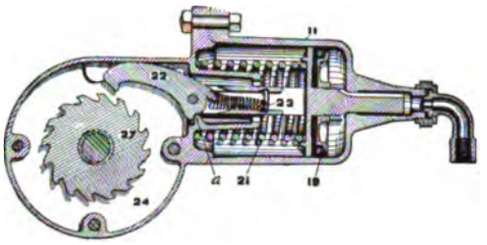


Fig. 886. Cross Section.

American Automatic Slack Adjuster. American Brake Co., Makers.

Fig. 887. Gould Automatic Slack Adjuster, Freight Equipment.

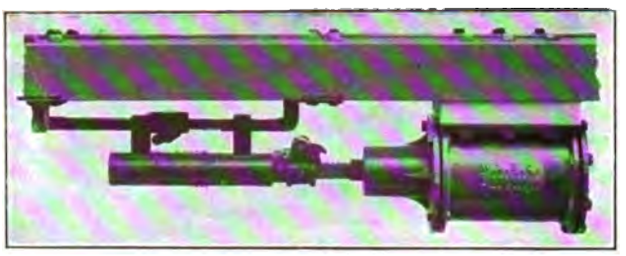


Fig. 888. Gould Automatic Slack Adjuster, Passenger Equipment.

Gould Coupler Co., Makers.

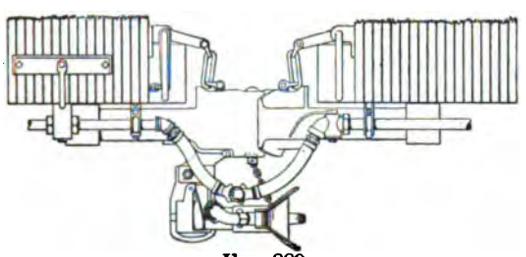


Fig. 889.
Elevation of Freight Equipment Showing Interchange Coupled.

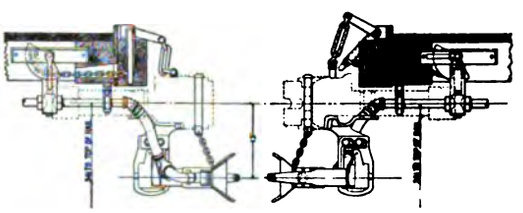


Fig. 889A. Elevation of Freight Equipment.

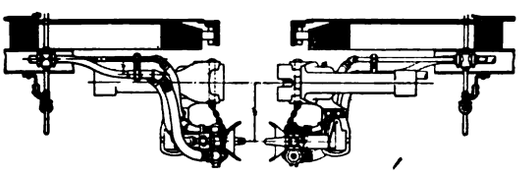


Fig. 889B.
Elevation of Passenger Equipment.

Westinghouse Automatic Air and Steam Coupler. American Brake Co., Makers.

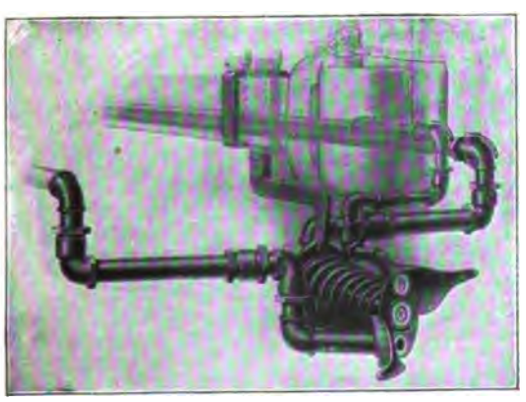


Fig. 890. Passenger Equipment Uncoupled.

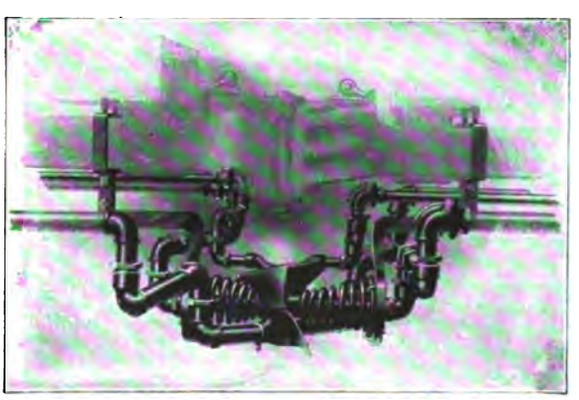


Fig. 890A. Passenger Equipment Coupled.

Forsyth Automatic Air and Steam Hose Coupler.
Forsyth Automatic Air and Steam Coupler Co., Makers.

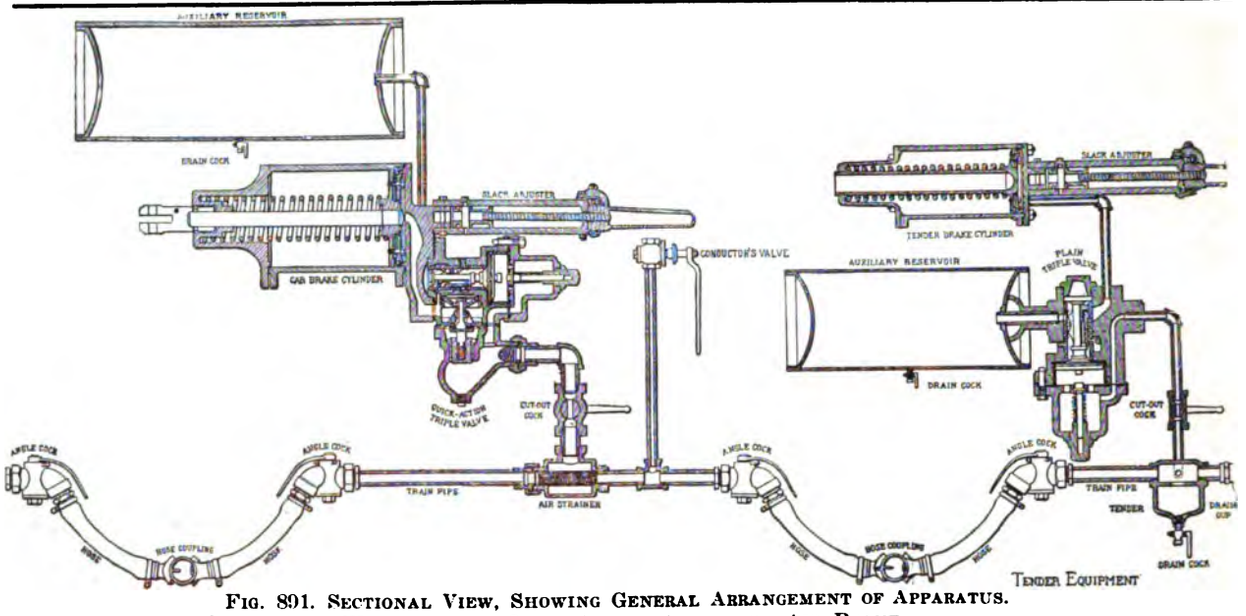


FIG. 891. SECTIONAL VIEW, SHOWING GENERAL ARRANGEMENT OF APPARATUS. WESTINGHOUSE QUICK-ACTION AUTOMATIC AIR BRAKE.

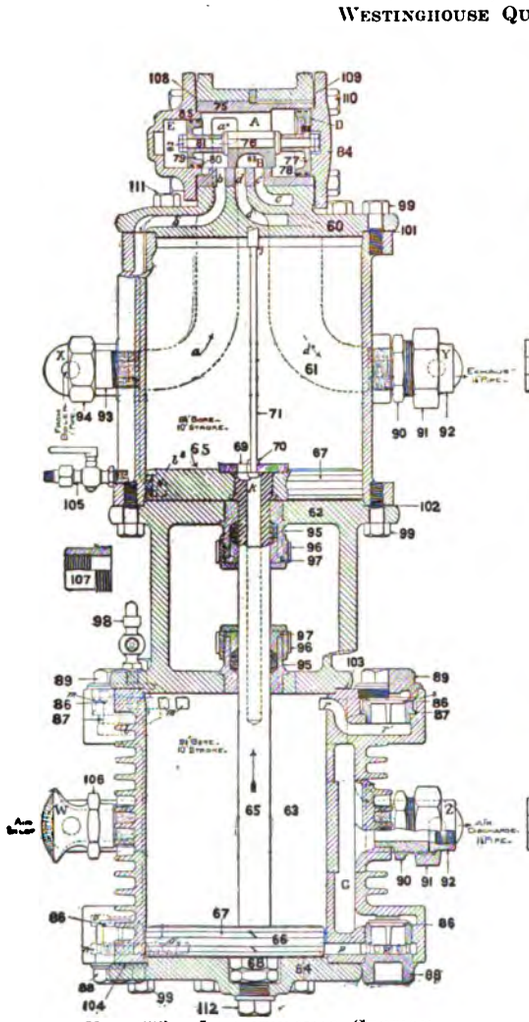


FIG. 893. LONGITUDINAL SECTION. NINE-AND-ONE-HALF-INCH AIR PUMP.

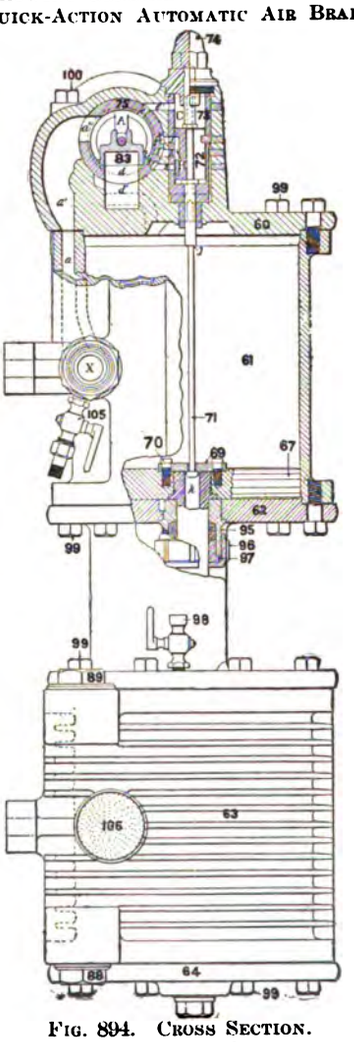


FIG. 894. CROSS SECTION. WESTINGHOUSE AIR BRAKE COMPANY.

NAMES OF PARTS OF PUMPS, FIGS. 893-894.

60. *Top Head*
61. *Steam Cylinder*
62. *Center Piece*
63. *Air Cylinder*
64. *Lower Head*
65. *Steam Piston and Rod*
66. *Air Piston*
67. *Piston Packing Ring*
68. *Piston Rod Nut*
69. *Reversing Valve Plate*
70. *Reversing Valve Plate Bolt*
71. *Reversing Valve Rod*
72. *Reversing Valve*
73. *Reversing Valve Chamber Bush*
74. *Reversing Valve Chamber Cap*
75. *Main Valve Bush*
76. *Main Valve Pistons*
77. *Large Main Valve Piston*

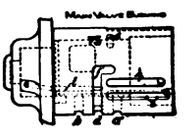


FIG. 892. MAIN VALVE BUSHING.

78. *Large Main Valve Piston Packing Ring*
79. *Small Main Valve Piston*
80. *Small Main Valve Piston Packing Ring*
81. *Main Valve Stem*
82. *Main Valve Stem Nut*
83. *Main Slide Valve*
84. *Right Main Valve Cylinder Head*
85. *Left Main Valve Cylinder Head*
86. *Air Valve*
87. *Air Valve Seat*
88. *Air Valve Cage*
89. *Valve Chamber Cap*
90. *1¼ in Union Stud*
91. *1¼ in Union Nut*
92. *1¼ in Union Swivel*
93. *1 in Steam Pipe Stud*
94. *Governor Union Nut*
95. *Stuffing Box*
96. *Stuffing Box Nut*
97. *Stuffing Box Gland*
98. *Air Cylinder Oil Cup*
99. *Short Cap Screw*
100. *Long Cap Screw*
101. *Upper Steam Cylinder Gasket*
102. *Lower Steam Cylinder Gasket*
103. *Upper Air Cylinder Gasket*
104. *Lower Air Cylinder Gasket*
105. *Drain Cock*
106. *Air Strainer*
107. *1 in Steam Pipe Sleeve*
108. *Left Main Valve Head Gasket*
109. *Right Main Valve Head Gasket*
110. *Main Valve Head Bolt*
111. *Cap Screw*
112. *Cylinder Head Plug*

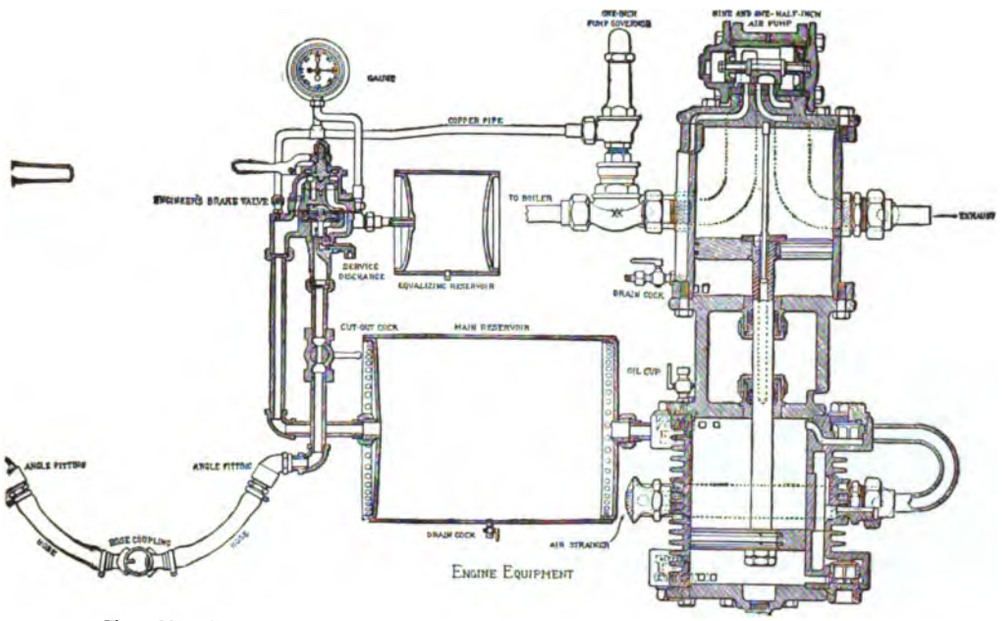


FIG. 895. SECTIONAL VIEW, SHOWING GENERAL ARRANGEMENT OF APPARATUS. WESTINGHOUSE QUICK-ACTION AUTOMATIC AIR BRAKE.

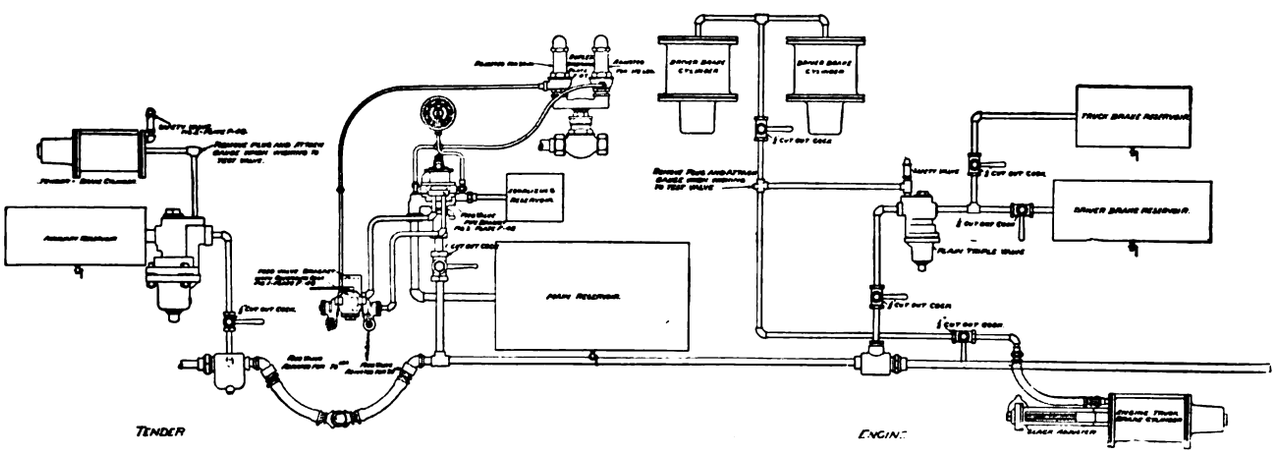


FIG. 896. DIAGRAM SHOWING ARRANGEMENT OF APPARATUS FOR HIGH PRESSURE CONTROL.

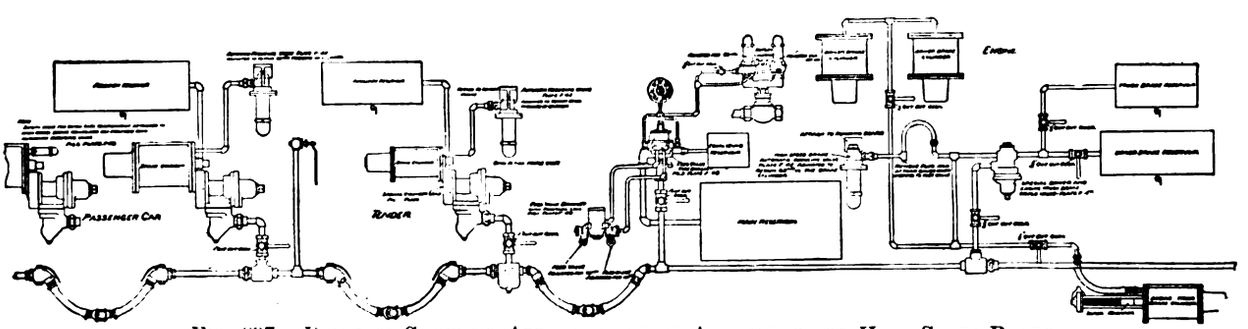


FIG. 897. DIAGRAM SHOWING ARRANGEMENT OF APPARATUS FOR HIGH SPEED BRAKE.

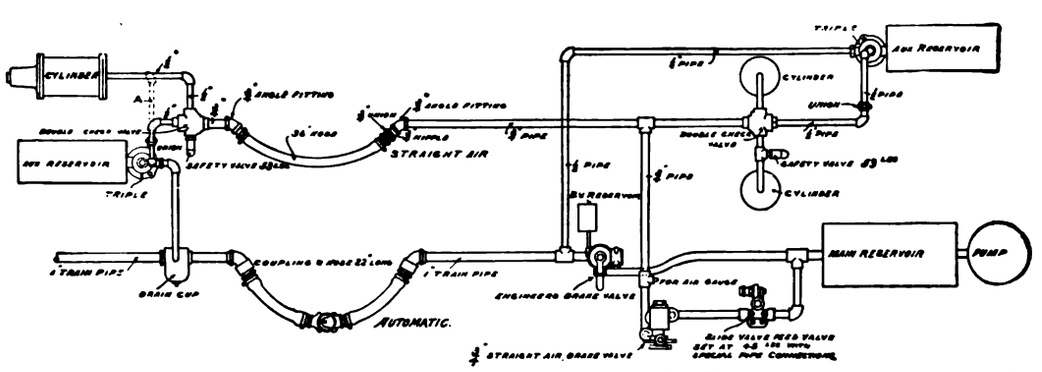
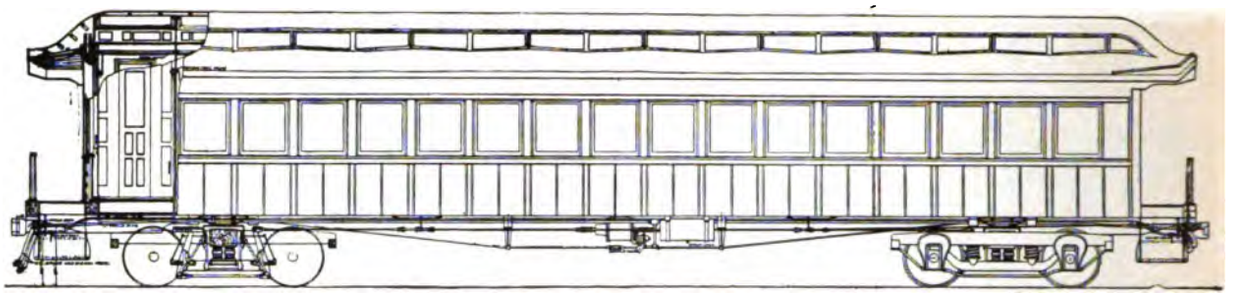
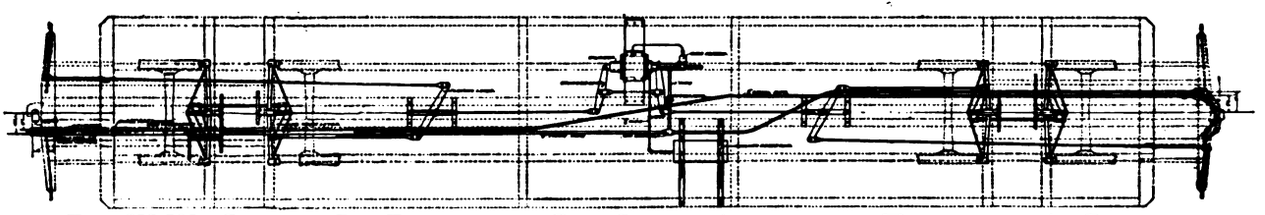


FIG. 898. METHOD OF PIPING COMBINED AUTOMATIC AND STRAIGHT-AIR EQUIPMENT ON ENGINE AND TENDER.





FIGS. 899-900. SECTIONAL SIDE ELEVATION AND PLAN SHOWING APPLICATION OF WESTINGHOUSE AIR BRAKE TO A PASSENGER CAR.

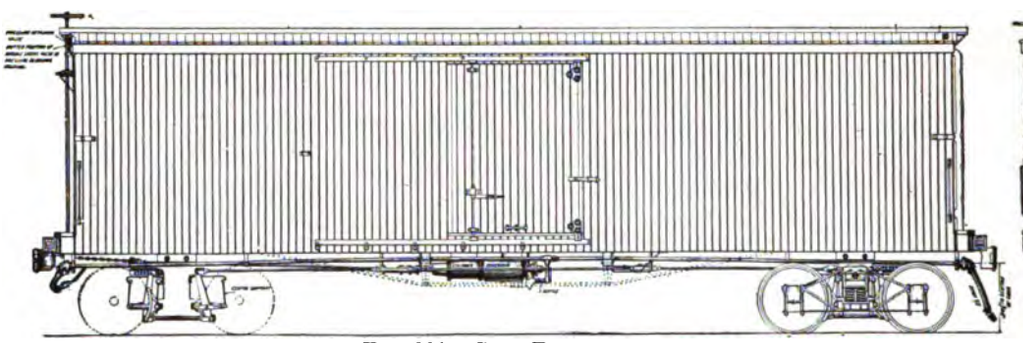


FIG. 901. SIDE ELEVATION.

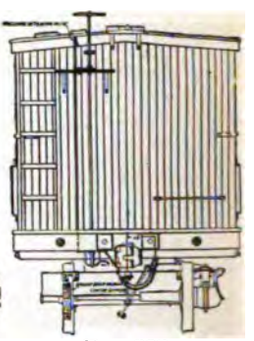


FIG. 902.
END ELEVATION.

FIG. 904.
CROSS SECTION OF UNDERFRAME.

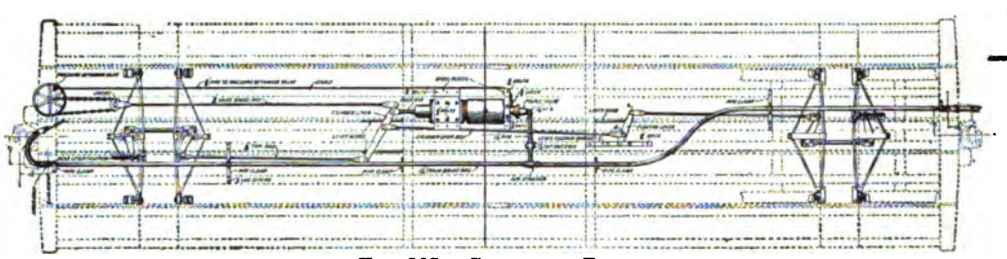
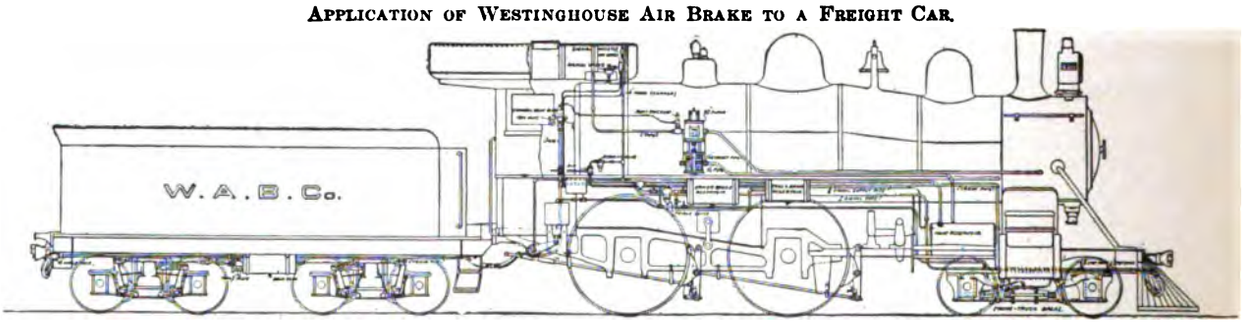
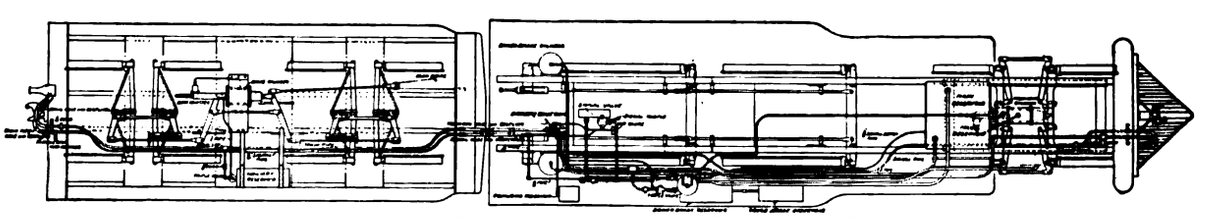


FIG. 903. SECTIONAL PLAN.

APPLICATION OF WESTINGHOUSE AIR BRAKE TO A FREIGHT CAR.





FIGS. 905-906. SECTIONAL SIDE ELEVATION AND PLAN OF LOCOMOTIVE, SHOWING APPLICATION OF WESTINGHOUSE AIR BRAKE.

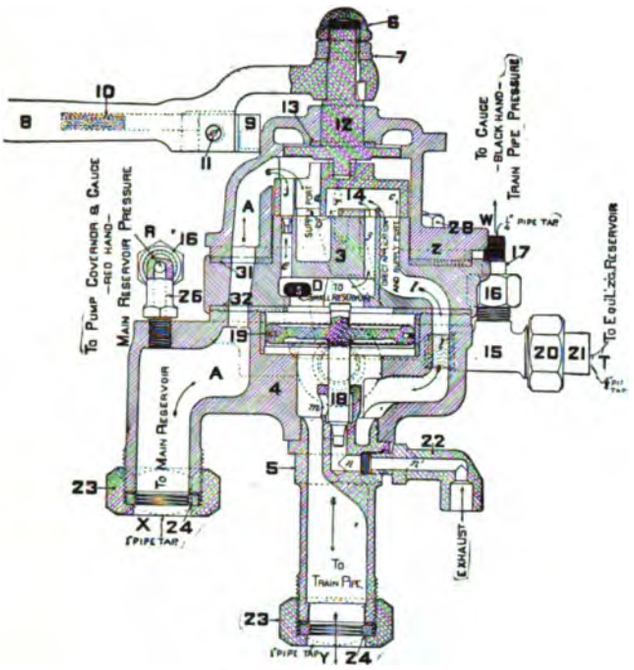

To Pump Governor & Gauge —Red Hand— Main Reservoir Pressure
To Gauge —Black Hand— Train Pipe Pressure
To Equalizing Reservoir
To Main Reservoir
To Train Pipe
Exhaust
X (Pipe Tap) 24
Y (Pipe Tap) 24

FIG. 907. LONGITUDINAL SECTION.

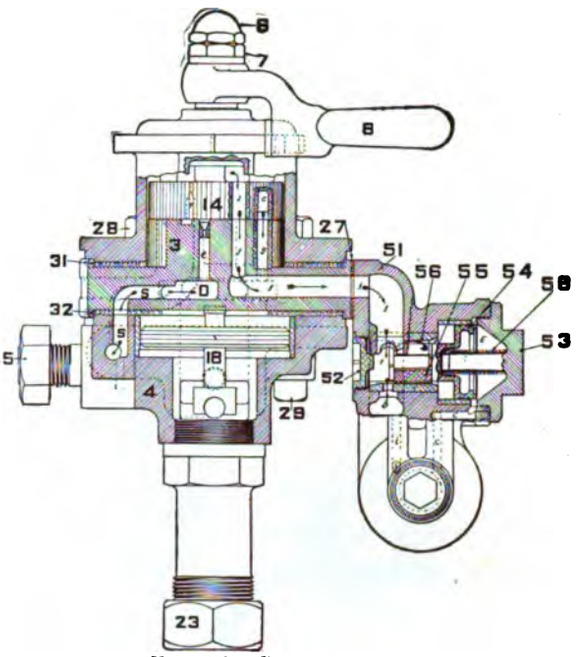


FIG. 908. CROSS SECTION.

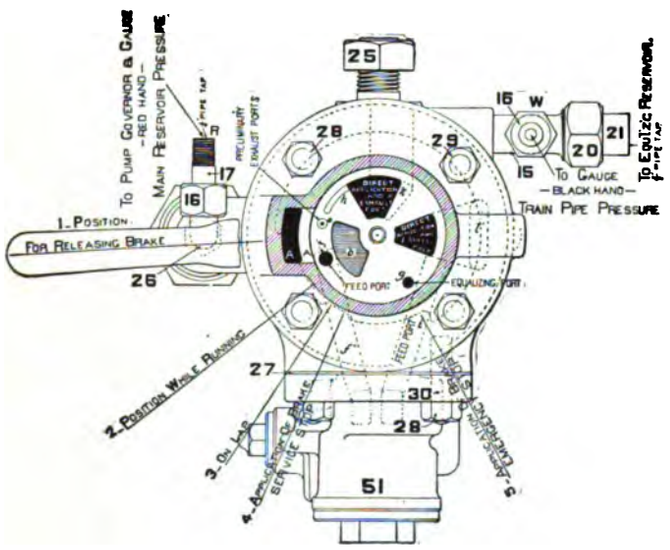

To Pump Governor & Gauge —Red Hand— Main Reservoir Pressure
To Gauge —Black Hand— Train Pipe Pressure
To Equalizing Reservoir
1-Position For Releasing Brake
2-Position While Running
3-Oil Cap
4-Application & Release Service Feed Port
5-Application & Release Emergency Feed Port
Direct Exhaust Ports
Feed Port
Equalizing Port

FIG. 909. PLAN. ENGINEER'S BRAKE VALVE.

NAMES OF PARTS, ENGINEER'S BRAKE VALVE. FIGS. 907-909.

2. *Valve Body*
3. *Rotary Valve Seat*
4. *Bottom Case*
5. *Bottom Cap*
6. *Jam Nut*
7. *Top Nut*
8. *Handle*
9. *Handle Bolt*
10. *Handle Bolt Spring*
11. *Handle Bolt Screw*
12. *Rotary Valve Key*
13. *Washer*
14. *Rotary Valve*
15. *Gage Pipe Tee*
16. *¼ in Union Nut*
17. *¼ in Union Swivel*
18. *Piston Valve*
19. *Piston Ring*
20. *⅜ in Union Nut*
21. *⅜ in Union Swivel*
22. *Exhaust Pipe Fitting*
23. *1 in Union Nut*
24. *1 in Union Swivel*
25. *Holding Nut.*
26. *Gage Pipe Fitting*
27. *Feed Valve Case Gasket*
28. *½ in Nut*
29. *½ in Bolt*
30. *Feed Valve Stud*
31. *Upper Gasket*
32. *Lower Gasket*

51. *Feed Valve Body*
52. *Flush Nut*
53. *Cap Nut*
54. *Supply Valve Piston*
55. *Supply Valve*
56. *Supply Valve Spring*
57. *Diaphragm*
58. *Supply Valve Piston Spring*
59. *Regulating Valve*
60. *Regulating Valve Spring*
61. *Regulating Valve Cap Nut*
62. *Spring Box*
63. *Diaphragm Ring*
64. *Diaphragm Spindle*
65. *Regulating Nut*
66. *Check Nut*
67. *Regulating Spring*

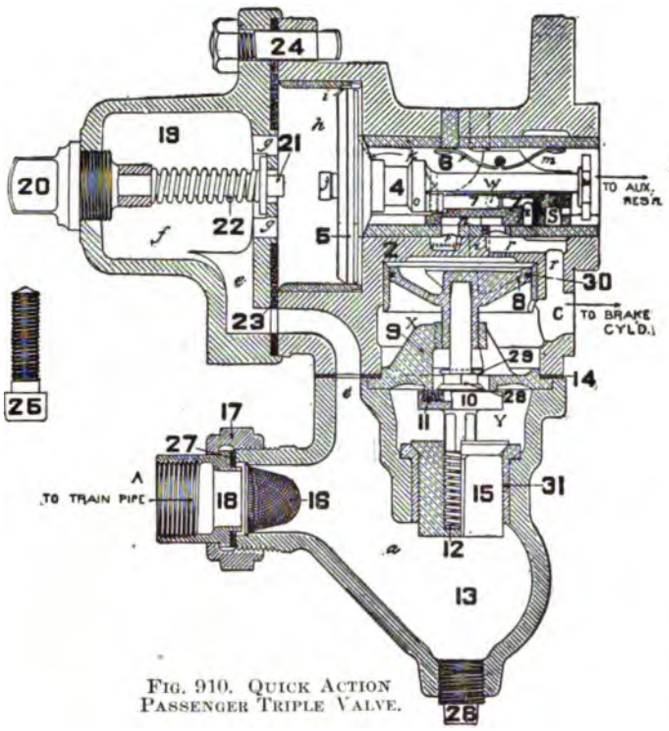
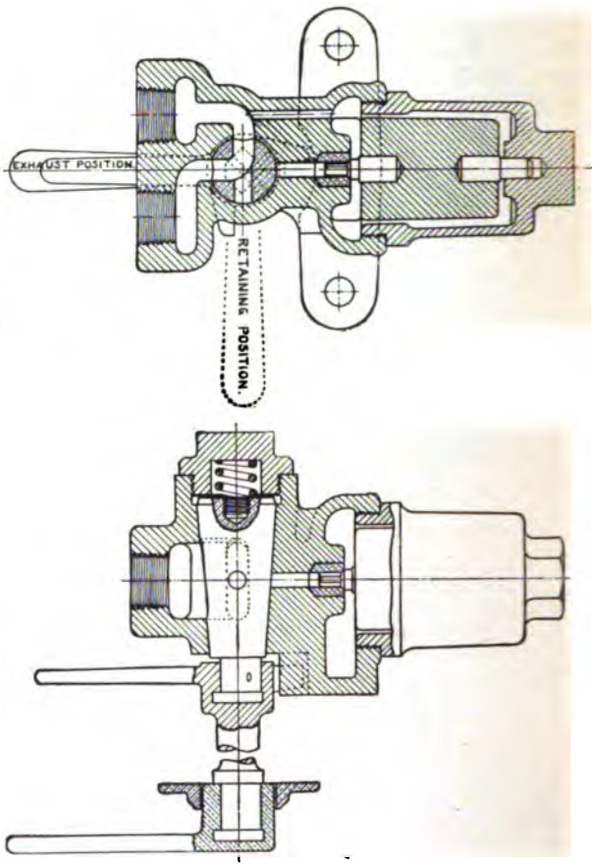


FIG. 910. QUICK ACTION PASSENGER TRIPLE VALVE.



FIGS. 911-912. PRESSURE RETAINING VALVE, PASSENGER CARS.

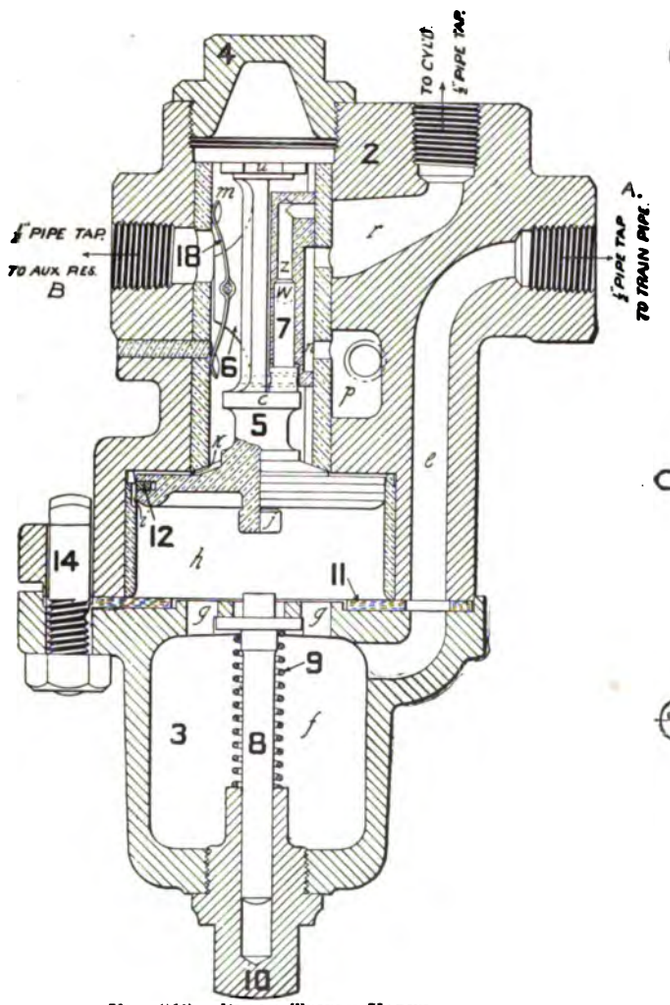
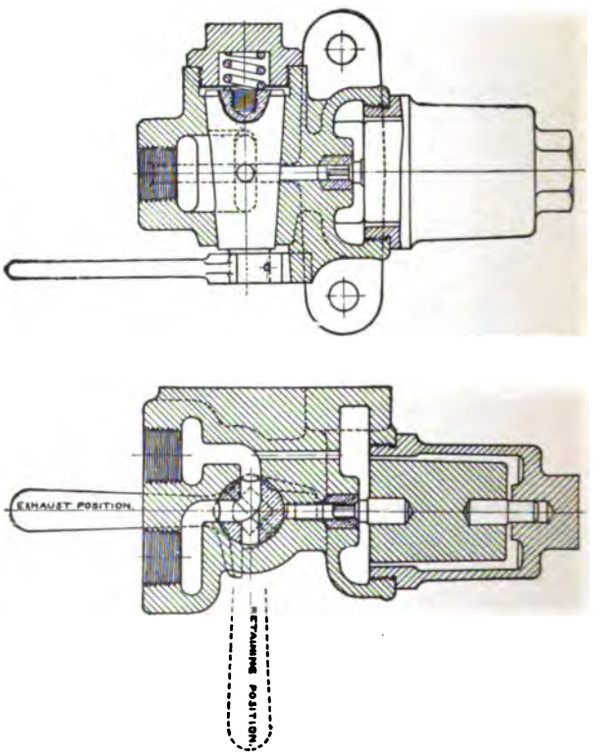


FIG. 913. PLAIN TRIPLE VALVE.



FIGS. 914-915. PRESSURE RETAINING VALVE, FREIGHT CARS.

NAMES OF PARTS, PLAIN TRIPLE VALVE. FIG. 913.

2. *Triple Valve Body*
3. *Cylinder Cap*
4. *Cap Nut*
5. *Piston*
6. *Slide Valve*
7. *Graduating Valve*
8. *Graduating Stem*
9. *Graduating Spring*
10. *Graduating Stem Nut*
11. *Cylinder Gasket*
12. *Packing Ring*
14. *Bolt and Nut*
18. *Slide Valve Spring*

NAMES OF PARTS, QUICK ACTION TRIPLE VALVE. FIG. 910.

2. *Triple Valve Body*
3. *Slide Valve*
4. *Piston*
5. *Packing Ring*
6. *Slide Valve Spring*
7. *Graduating Valve*
8. *Emergency Valve Piston*
9. *Emergency Valve Seat*
10. *Emergency Valve*
11. *Rubber Seat*
12. *Check Valve Spring*
13. *Check Valve Case*
14. *Check Valve Case Gasket*
15. *Check Valve*
16. *Strainer*
17. *Union Nut*
18. *Union Swivel*
19. *Cylinder Cap*
20. *Graduating Stem Nut*
21. *Graduating Stem*
22. *Graduating Spring*
23. *Cylinder Cap Gasket*
24. *Bolt and Nut*
25. *½ in Cap Screw*
26. *½ in Plug*
27. *Union Gasket*
28. *Emergency Valve Nut*
29. *Cotter Pin*
30. *Emergency Valve Piston Packing Ring*

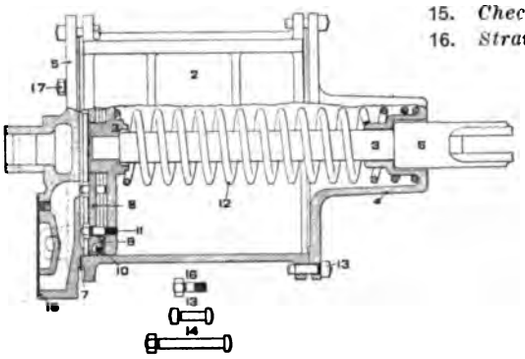


FIG. 916. TWELVE INCH PASSENGER CAR BRAKE CYLINDER.

NAMES OF PARTS. FIG. 916.

2. *Cylinder Body*
3. *Piston and Rod*
4. *Non Pressure Head*
5. *Pressure Head*
6. *Cross Head*
7. *Cylinder Gasket*
8. *Follower*
9. *Packing Leather*
10. *Packing Expander*
11. *Follower Stud and Nut*
12. *Release Spring*
13. *Cylinder Head Bolt and Nut*
14. *Triple Valve Bolt and Nut*
15. *Triple Valve Gasket*
16. *Triple Valve Stud and Nut*
17. *½ in Plug*

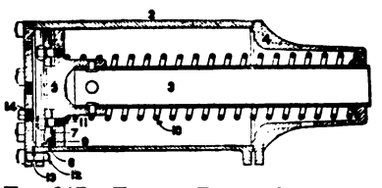


FIG. 917. TENDER BRAKE CYLINDER.

NAMES OF PARTS. FIG. 917.

2. *Cylinder Body*
3. *Piston Head and Rod*
4. *Back Head*
5. *Front Head*
7. *Follower*
8. *Packing Leather*
9. *Packing Expander*
10. *Release Spring*
11. *Follower Stud and Nut*
12. *Cylinder Head, Bolt and Nut*
13. *Gasket*
14. *Oiling Plug*

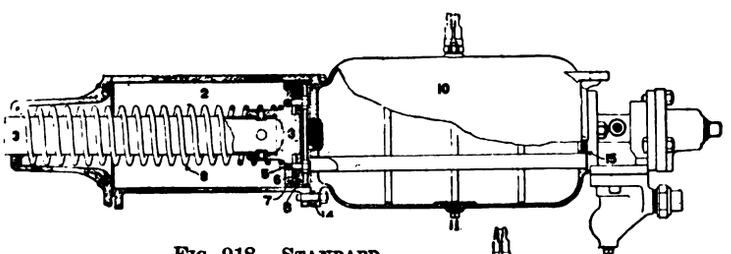


FIG. 918. STANDARD.

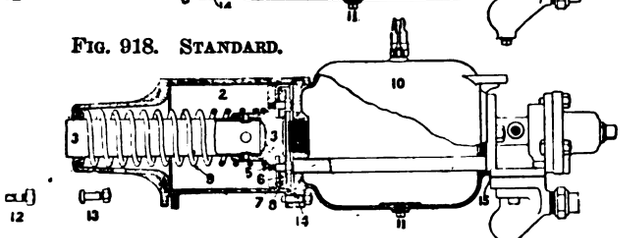


FIG. 919. SPECIAL.
FREIGHT BRAKE CYLINDERS, RESERVOIRS AND TRIPLE VALVES.

NAMES OF PARTS OF FREIGHT CYLINDERS. FIGS. 918-919.

2. *Cylinder Body*
3. *Piston Head and Rod*
4. *Back Cylinder Head*
5. *Follower Stud and Nut*
6. *Follower*
7. *Piston Packing Leather*
8. *Packing Expander*
9. *Release Spring*
10. *Reservoir*
11. *Drain Plug*
12. *Reservoir Stud and Nut*
13. *Cylinder Head Bolt and Nut*
14. *Cylinder Gasket*
15. *Triple Valve Gasket*

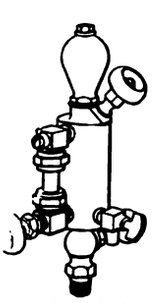


FIG. 920. AIR PUMP LUBRICATOR.

FIG. 921. DUPLEX AIR GAGE.

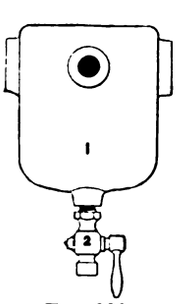


FIG. 922. TENDER DRAIN CUP AND COCK.

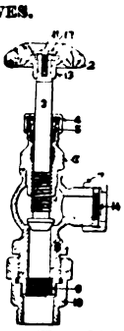


FIG. 923. STEAM VALVE.

FIG. 924. RESERVOIR UNION.

FIG. 925. FITTING. ANGLE

FIG. 926. TRIPLE VALVE BRACKET.

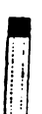


FIG. 927. TRIPLE VALVE NIPPLE.

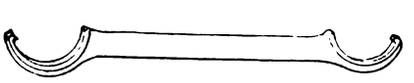


FIG. 928. CAM-NUT WRENCH.

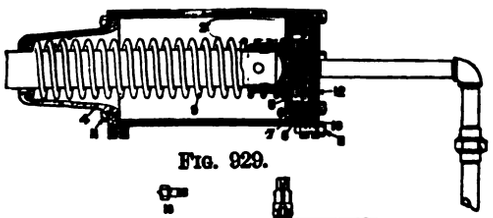


FIG. 929.

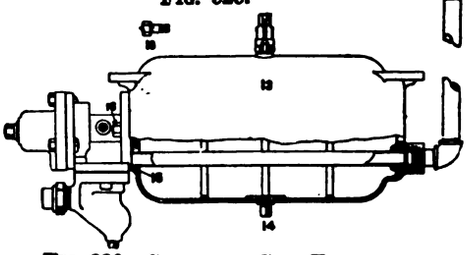


FIG. 930. SECTIONAL SIDE ELEVATION.

NAMES OF PARTS OF FREIGHT BRAKE CYLINDER.
FIGS. 929-930.

2. *Cylinder Body*
3. *Piston Head and Rod, Follower Studs and Nut*
4. *Back Head*
5. *Follower Stud and Nut*
6. *Follower*
7. *Piston Packing Leather*
8. *Packing Expander*
9. *Release Spring*
10. *Gasket*
11. *Cylinder Head Bolt and Nut*
12. *Front Head*
13. *Special Auxiliary Reservoir*
14. *Drain Plug*
15. *Triple Valve Gasket*
16. *Reservoir Stud and Nut*

STANDARD SPECIAL FREIGHT BRAKE CYLINDER, WITH DETACHED AUXILIARY RESERVOIR AND TRIPLE VALVE.

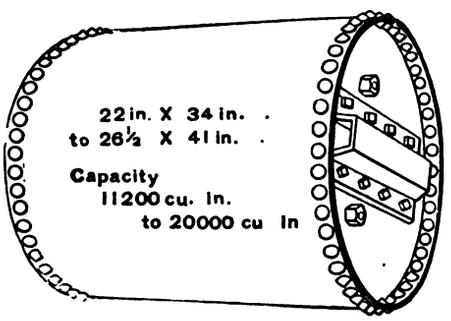


FIG. 931.
MAIN RESERVOIR FOR LOCOMOTIVE.

FIG. 932. RESERVOIR DRAIN COCK.

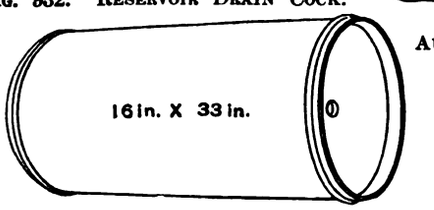


FIG. 934.
AUXILIARY RESERVOIR FOR 14-IN. CYLINDERS.

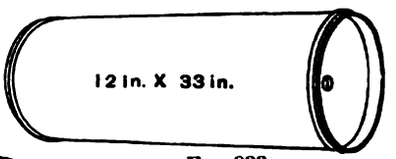


FIG. 933.
AUXILIARY RESERVOIR FOR 10-IN. CYLINDER.

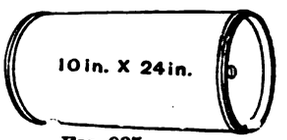


FIG. 935.
AUXILIARY RESERVOIR FOR LOCOMOTIVE DRIVER BRAKE AND TENDERS.

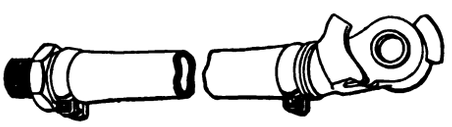


FIG. 936.
HOSE AND COUPLING, PASSENGER.

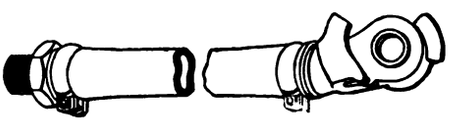


FIG. 937.
HOSE AND COUPLING, FREIGHT.

FIG. 938.
HOSE NIPPLE.

FIG. 939.
HOSE COUPLING, PASSENGER.

FIG. 940.
HOSE COUPLING, FREIGHT.

FIG. 941.
1¼-IN. DUMMY COUPLING.

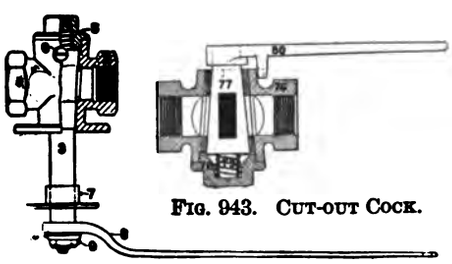


FIG. 942. CONDUCTOR'S VALVE.

FIG. 943. CUT-OUT COCK.

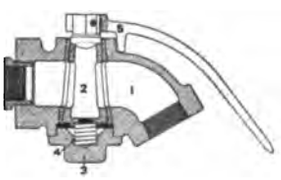


FIG. 944. ANGLE COCK.

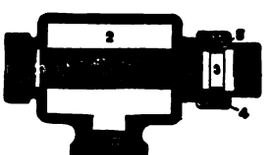


FIG. 945. AIR STRAINER.

FIG. 946.
HOSE CLAMP.

NAMES OF PARTS.
FIG. 942.

2. *Valve Body*
3. *Valve Key*
4. *Valve Cap*
5. *Key Spring*
6. *Key Stop*
7. *Key Escutcheon*
8. *Valve Handle*
9. *Key Nut*
10. *Key Washer*

NAMES OF PARTS.
FIG. 943.

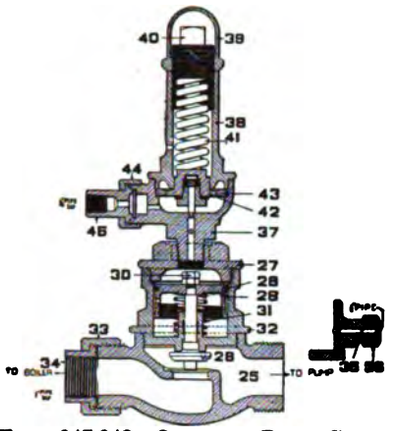
76. *Cock Body*
77. *Cock Key*
78. *Cock Cap*
79. *Key Spring*
80. *Handle*

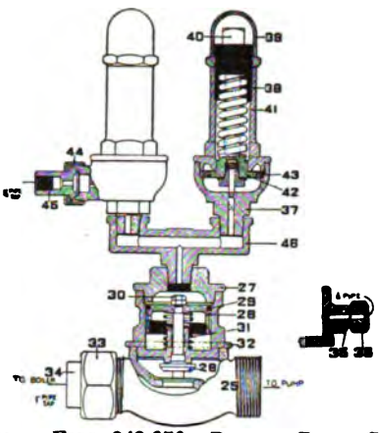
NAMES OF PARTS.
FIG. 944.

1. *Angle Cock Body*
2. *Angle Cock Key*
3. *Angle Cock Cap*
4. *Angle Cock Key Spring*
5. *Angle Cock Handle*

NAMES OF PARTS.
FIG. 945.

1. *1 in Union Swivel*
2. *Drain Cup Body*
4. *Union Nut*
5. *Union Gasket*
6. *Strainer*





FIGS. 947-948. ONE-INCH PUMP GOVERNOR. FIGS. 949-950. DUPLEX PUMP GOVERNOR.

NAMES OF PARTS.
FIG. 951.

2. *Safety Valve Body*
3. *Regulating Nut*
4. *Cap Nut*
5. *Regulating Spring*
6. *Valve*

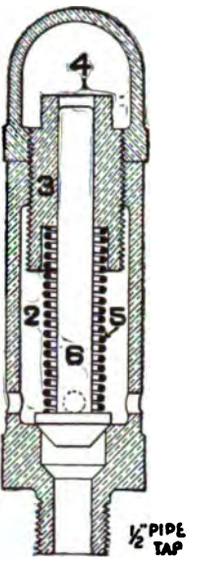


FIG. 951. SAFETY VALVE.

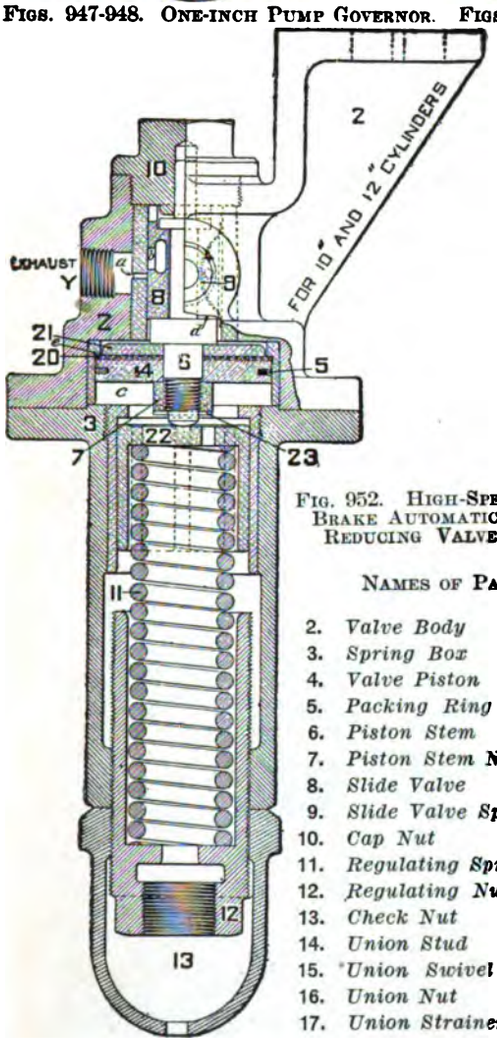


FIG. 952. HIGH-SPEED BRAKE AUTOMATIC REDUCING VALVE.

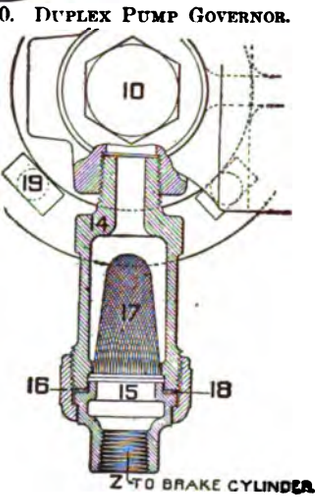


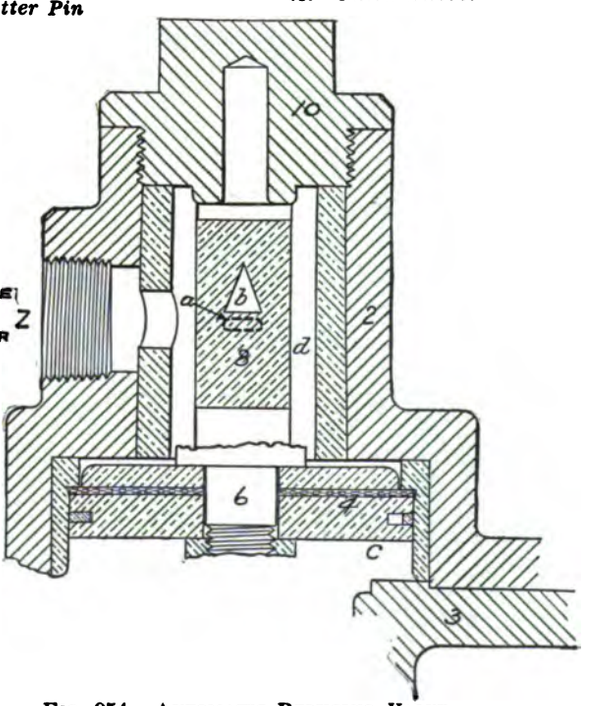
FIG. 953. STRAINER.

NAMES OF PARTS. FIGS. 952-953.

2. *Valve Body*
3. *Spring Box*
4. *Valve Piston*
5. *Packing Ring*
6. *Piston Stem*
7. *Piston Stem Nut*
8. *Slide Valve*
9. *Slide Valve Spring*
10. *Cap Nut*
11. *Regulating Spring*
12. *Regulating Nut*
13. *Check Nut*
14. *Union Stud*
15. *Union Swivel*
16. *Union Nut*
17. *Union Strainer*
18. *Union Gasket*
19. *Bolt and Nut*
20. *Leather Washer*
21. *Piston Disc*
22. *Spring Abutment*
23. *Cotter Pin*

NAMES OF PARTS. FIGS. 947-948.

25. *Steam Valve Body*
26. *Steam Valve*
27. *Cylinder Cap*
28. *Governor Piston*
29. *Piston Packing Ring*
30. *Governor Piston Nut*
31. *Governor Piston Spring*
32. *Steam Valve Cylinder*
33. *1 in Union Nut*
34. *1 in Union Swivel*
35. *Waste Pipe Stud*
36. *Waste Pipe Union Nut*
37. *Diaphragm Body*
38. *Spring Box*
39. *Check Nut*
40. *Regulating Nut*
41. *Regulating Spring*
42. *Diaphragm, complete*
43. *Diaphragm Ring*
44. *Union Nut*
45. *Union Swivel*



NAMES OF PARTS, DUPLEX PUMP GOVERNOR. FIGS. 949-950.

25. *Steam Valve Body*
26. *Steam Valve*
27. *Cylinder Cap*
28. *Governor Piston*
29. *Piston Packing Ring*
30. *Governor Piston Nut*
31. *Governor Piston Spring*
32. *Steam Valve Cylinder*
33. *1 in Union Nut*
34. *1 in Union Nut*
35. *Waste Pipe Stud*
36. *Waste Pipe Union Nut*
37. *Diaphragm Body*
38. *Spring Box*
39. *Check Nut*
40. *Regulating Nut*
41. *Regulating Spring*
42. *Diaphragm, complete*
43. *Diaphragm Ring*
44. *Union Nut*
45. *Union Swivel*
46. *Siamese Fitting*

FIG. 954. AUTOMATIC REDUCING VALVE.
POSITION OF PORTS, RELEASE.

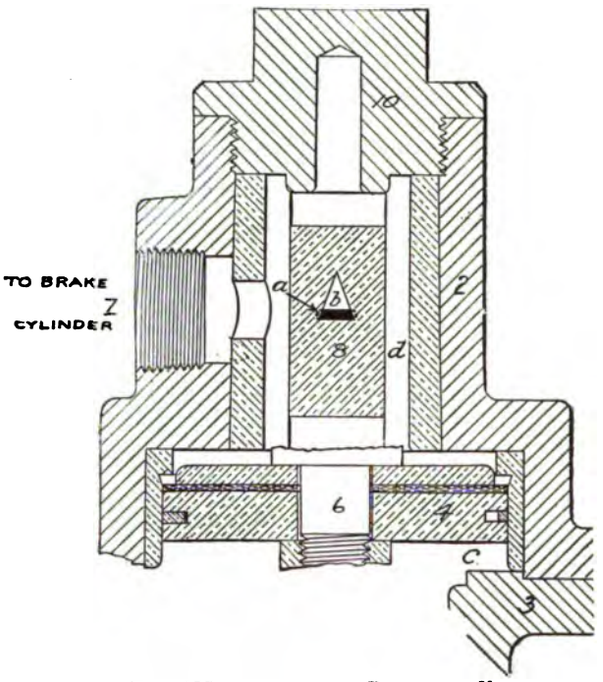


FIG. 955. AUTOMATIC REDUCING VALVE. POSITION OF PORTS, SERVICE STOP.

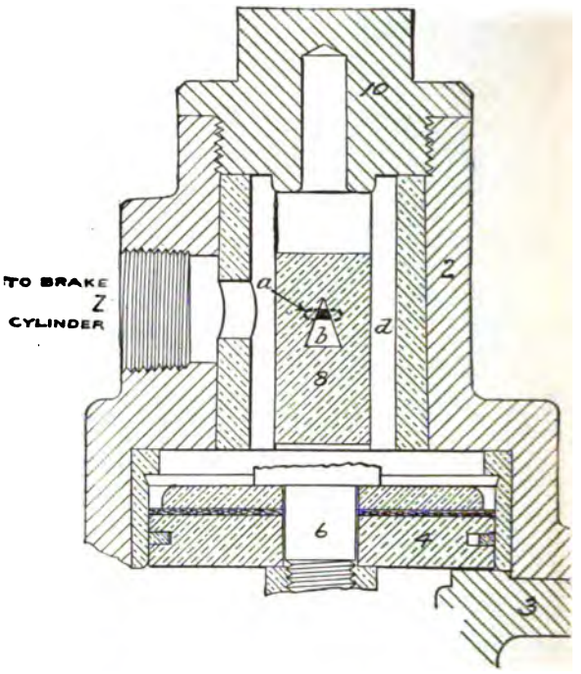


FIG. 956. AUTOMATIC REDUCING VALVE. POSITION OF PORTS. EMERGENCY STOP.

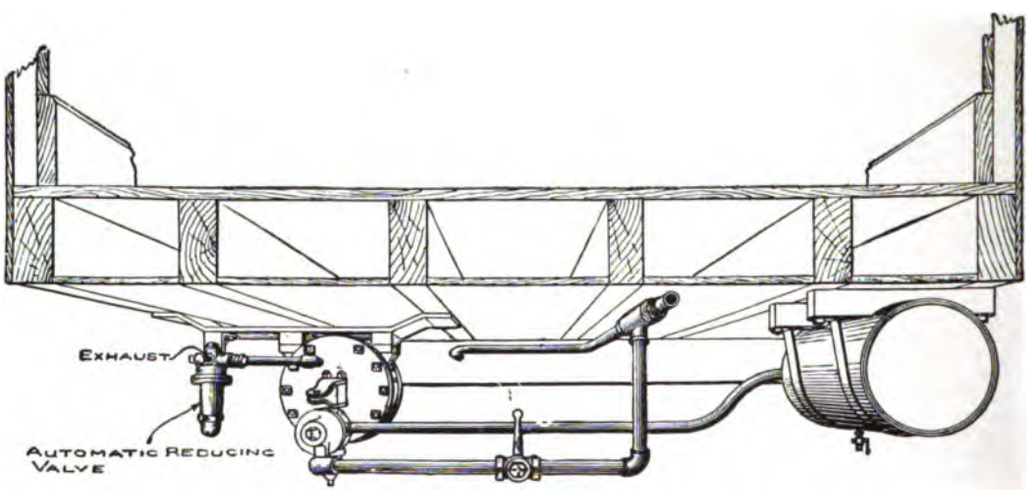


FIG. 957. AUTOMATIC REDUCING VALVE APPLIED TO A CAR.

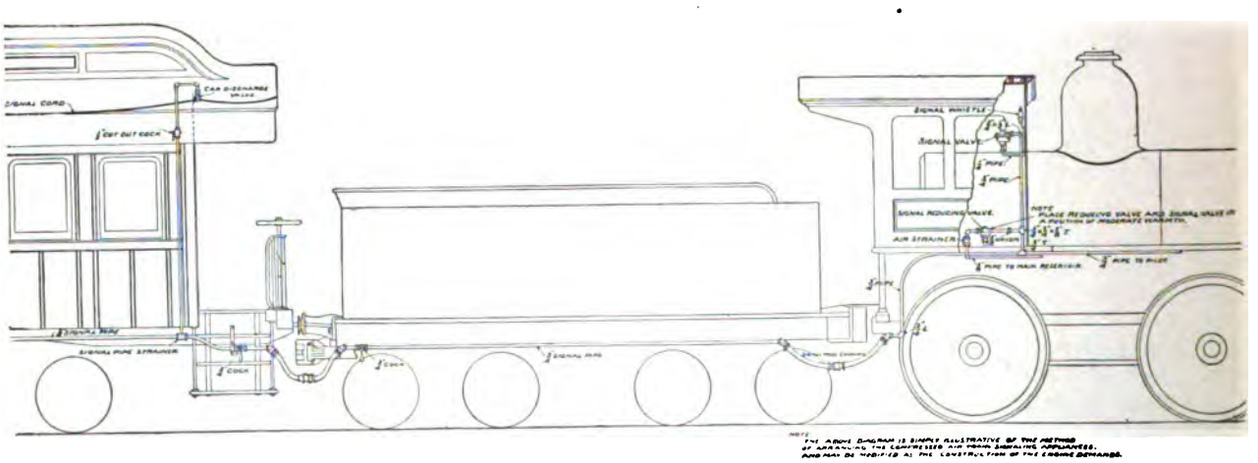
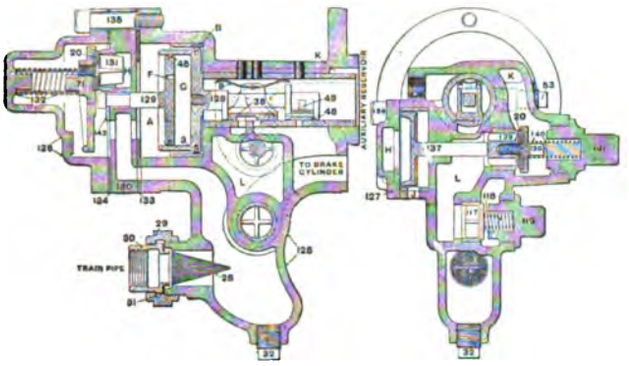
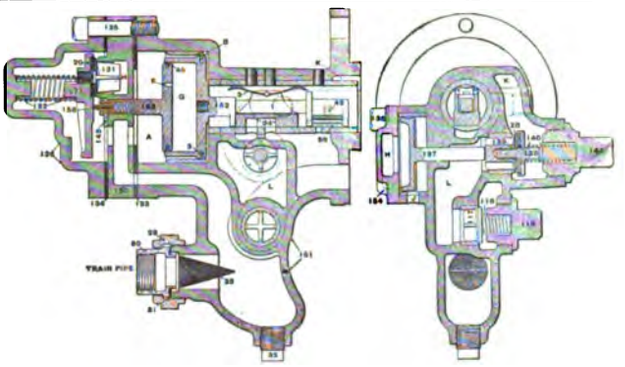


FIG. 958. SIDE ELEVATION SHOWING ARRANGEMENT OF AIR SIGNAL APPARATUS ON PASSENGER CAR AND LOCOMOTIVE.



FIGS. 959-960. QUICK ACTION TRIPLE VALVE. STYLES F. AND P.



FIGS. 961-962. SPECIAL QUICK ACTION TRIPLE VALVE FOR 12-IN. AND 14-IN. CYLINDERS.

NAMES OF PARTS OF TRIPLE VALVES. FIGS. 959-962.

3. *Main Piston Ring*
9. *Slide Valve Spring*
20. *Rubber Valve Seat*
28. *Strainer*
29. *Union Nut*
30. *Union Swivel*
31. *Union Gasket*
32. *Drain Plug*
38. *Slide Valve*
45. *Vent Valve Piston Ring*
48. *Graduating Valve*
49. *Graduating Valve Spring*
53. *Exhaust Hole Plug*
64. *Slide Valve*
66. *Graduating Valve*
71—131—20. *Vent Valve, complete*
117. *Check Valve*
118. *Check Valve Spring*
119. *Check Valve Cap*
125. *Triple Valve Body*
126. *Front Cap*
127. *Side Cap*
128. *Main Piston*
129. *Vent Valve Piston*
130. *Vent Valve Seat*
132. *Vent Valve Spring*
133. *Main Cylinder Gasket*
134. *Front Cap Gasket*
135. *Front Cap Bolt*
136. *Side Cap Bolt*
137. *Quick Action Valve Piston*
138-139-20. *Quick Action Valve, complete*
140. *Quick Action Valve Spring*
141. *Quick Action Valve Cap*
142. *Piston Stop*
143. *Piston Stop Screw*
151. *Triple Valve Body*
152. *Main Piston*
153. *Vent Valve Piston*
154. *Side Cap*
156. *Vent Valve Piston Spring*

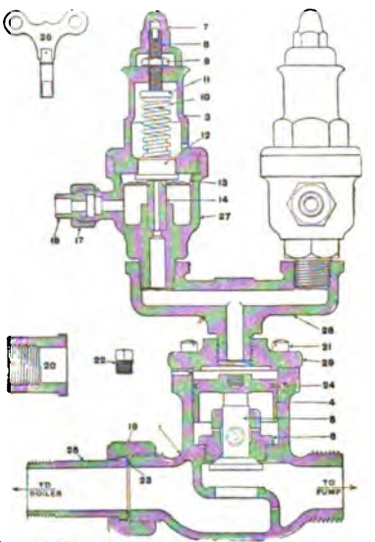


FIG. 963. DUPLEX PUMP GOVERNOR.

NAMES OF PARTS DUPLEX AIR PUMP. FIG. 965.

1.-2. *Steam Cylinders*
3.-4. *Air Cylinders*
5.-6. *Slide Valves*
9.-10. *Receiving Air Valves*
11.-12.-13.-14. *Discharge Air Valves*
15. *Steam Chest Caps*
16.-17. *Steam Chest Bushings*
18. *Piston Rods*
19. *Steam Head*
20. *Tappet Plates*
21.-22. *7 in Steam Pistons*
31. *5 in Air Piston, No. 1 Pump*
7 in Air Piston, No. 2 Pump
32. *7 in Air Piston, No. 1 Pump*
10 in Air Piston, No. 2 Pump
33. *5 in Piston Rings, No. 1 Pump*
7 in Piston Rings, No. 2 Pump
34. *7 in Piston Rings, No. 1 Pump*
10 in Piston Rings, No. 2 Pump
35. *Stuffing Boxes*
37. *Stuffing Box Nuts*
38. *Stuffing Box Glands*
39. *Lower Receiving Valve Chamber*
40. *Lower Intermediate Valve Seat*
41. *Upper Intermediate Valve Seat*
41. *Upper Receiving Valve Seat*
42. *Upper Intermediate Valve Seat*
43. *Upper Intermediate Valve Chamber*
44. *Upper Discharge Valve Cap*
45. *Upper Discharge Valve Seat*
46. *Lower Discharge Valve Seat*
47. *Top Head*
48. *Upper Air Cylinder Gasket*
49. *Lower Air Cylinder Gasket*
50. *Upper Steam Cylinder Gasket*
51. *Lower Steam Cylinder Gasket*
52. *Cylinder Head Bolts*
53. *Oil Cups*
54. *Drain Cock*
55. *Tappet Plate Bolt*
56. *Governor Union Stud*
57. *Governor Union Nut*
58. *Exhaust Union Stud*
59. *Exhaust Union Nut*
60. *Exhaust Union Swivel*
63. *Air Union Stud*
64. *Air Union Nut*
65. *Air Union Swivel*
66. *Cylinder Head Bolt Wrench*
67. *Cap Wrench*
68. *Valve Chamber Wrench*
69. *Packing Nut Wrench*
74. *Piston Rod Nut*
87. *Jacket Screws*

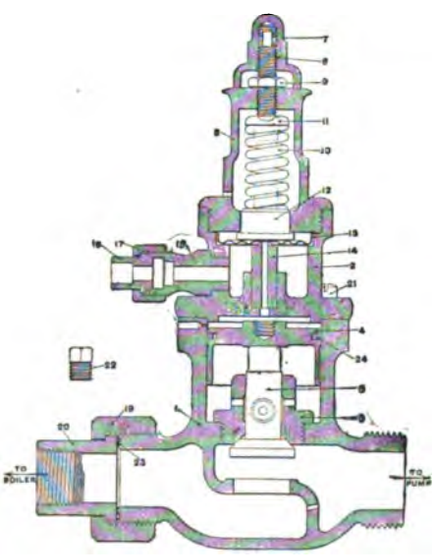
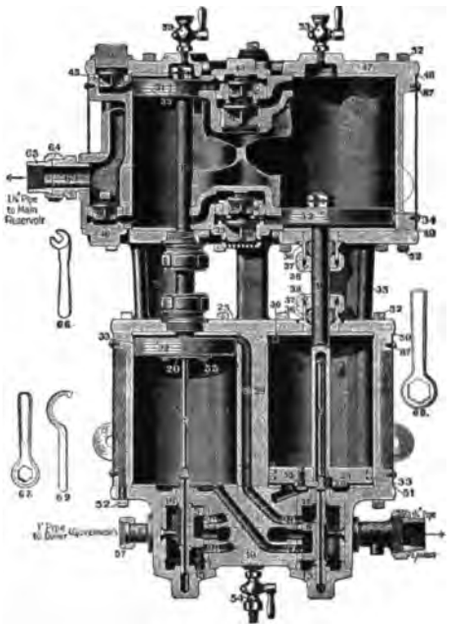


FIG. 964. PUMP GOVERNOR.

NAMES OF PARTS OF PUMP GOVERNORS. FIGS. 963-964.

1. *Steam Valve Body*
2. *Air Valve Chamber*
3. *Spring Casing*
4. *Piston*
5. *Steam Valve*
6. *Steam Valve Guide*
7. *Cap*
8. *Adjusting Screw*
9. *Jam Nut*
10. *Regulating Pin*
11. *Upper Spring Washer*
12. *Diaphragm Button*
13. *Diaphragm*
14. *Air Valve Seat*
16. *Air Union Stud*
17. *Air Union Nut*
18. *Air Union Swivel*
19. *Steam Union Nut*
20. *Steam Union Swivel*
21. *Screw*
22. *Drain Plug*
23. *Steam Union Gasket*
24. *Piston Ring*
25. *Steam Union Swivel*
26. *Key*
27. *Siamese Fitting*
29. *Cylinder Cap*



FIGS. 965. DUPLEX AIR PUMP.
MADE IN TWO SIZES, NO. 1 AND NO. 2.

NAMES OF PARTS, PLAIN TRIPLE VALVE. FIG. 966.

3.	*Piston Ring*	14.	*Bracket*	38.	*Slide Valve*
9.	*Slide Valve Spring*	16.	*Nipple*	40.	*Piston*
11.	*Cap*	26.	*Cap Bolt*	48.	*Graduating Valve*
12.	*Gasket*	27.	*Triple Valve Body*	49.	*Graduating Valve Spring*
13.	*Drain Plug*	29.	*Plug*		

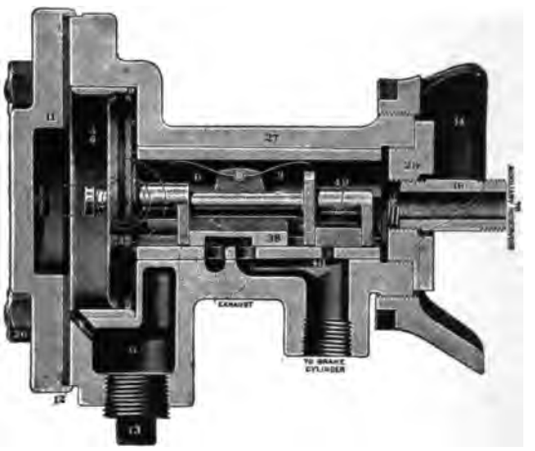


FIG. 966. PLAIN TRIPLE VALVE.
FOR 8-IN. AND 10-IN. CYLINDERS.

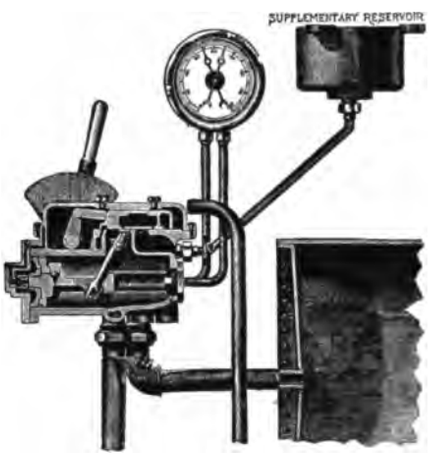
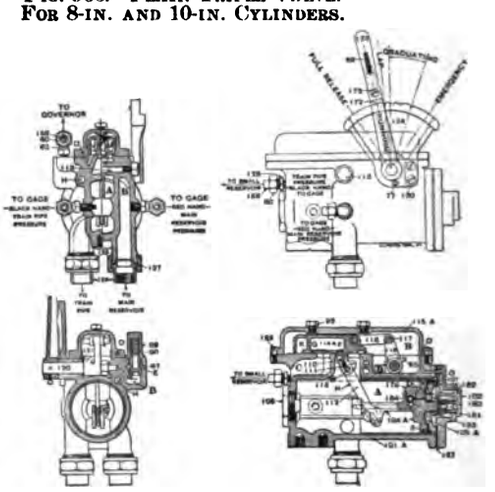


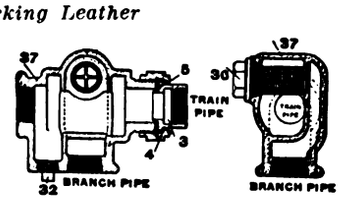
FIG. 967. ENGINEER'S BRAKE VALVE.
SHOWING CONNECTIONS.



FIGS. 968-971. ENGINEER'S BRAKE VALVE.

NAMES OF PARTS, ENGINEER'S BRAKE VALVE.
FIGS. 968-971.

3.	*Piston Ring*	108.	*Expander*	128.	*Small Union Stud*
60.	*Small Union Nut*	110.	*Graduating Valve*	129.	*Cover and Head Screws*
61.	*Union Swivel for ¼-inch Iron Pipe*	111.	*Graduating Valve Spring*	130.	*Quadrant Screws*
62.	*Gage and Governor Union Stud*	112.	*Graduating Valve Lever*	155.	*Supplementary Reservoir*
69.	*Handle Spring*	113.	*Fulcrum Pin*	156.	*Reservoir Plug*
77.	*Handle Set Screw*	114-A.	*Main Slide Valve*	158.	*Union Swivel for ⅜-inch Copper Pipe*
90.	*Feed Valve Spring*	115-A.	*Valve Cover*	167.	*Cap Gasket*
95.	*Lever Shaft Pin*	116.	*Links*	172.	*Quadrant Latch*
96.	*Oil Plugs*	117.	*Link Pins*	173.	*Latch Pin*
97.	*Feed Valve*	118.	*Slide Valve Lever*	179.	*Check Valve Cap*
98.	*Feed Valve Cap*	120.	*Lever Shaft*	180.	*Vent Valve*
101-A.	*Valve Body*	121.	*Lever Shaft Packing*	181.	*Follower Cap Nut*
102-A.	*Back Cap*	123.	*Handle*	182.	*Vent Valve Spring*
103.	*End Plug*	124.	*Quadrant*	183.	*Cotter Pin*
104-A.	*Piston*	125.	*One-inch Union Nut*	184.	*Ball Check Valve*
105-A.	*Follower*	126.	*One-inch Union Swivel*	185.	*Governor Connection Tee*
107.	*Packing Leather*	127.	*One-inch Union Gasket*		



FIGS. 972-973.
1¼-IN. BRAKE PIPE STRAINER.

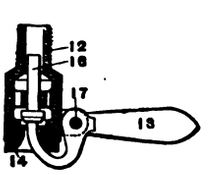


FIG. 974. AUTOMATIC
DRAIN COCK.

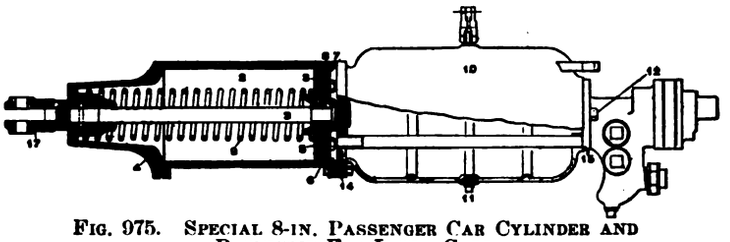


FIG. 975. SPECIAL 8-IN. PASSENGER CAR CYLINDER AND RESERVOIR FOR LIGHT CARS.

NAMES OF PARTS. FIG. 975.

2. *Cylinder Body*	6. *Follower*	10. *Reservoir*	14. *Cylinder Gasket*
3. *Piston and Rod*	7. *Packing Leather*	11. *Drain Plug*	15. *Triple Valve Gasket*
4. *Back Head*	8. *Expander*	12. *Reservoir Stud and Nut*	17. *Cross Head*
5. *Follower Stud and Nut*	9. *Release Spring*	13. *Cylinder Head Bolt and Nut*	

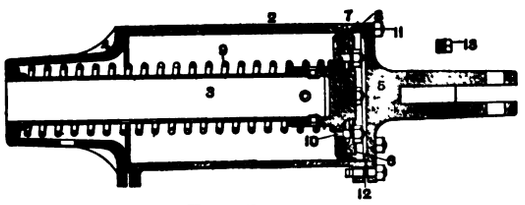


FIG. 976.
8-IN. FORKED HEAD TENDER CYLINDER.

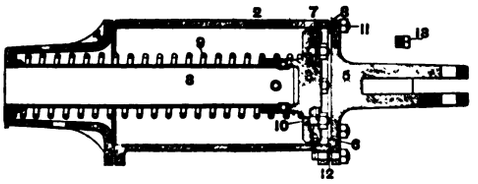


FIG. 977.
10-IN. FORKED HEAD TENDER CYLINDER.

NAMES OF PARTS, TENDER CYLINDERS. FIGS. 976-977.

2. *Cylinder Body*	5. *Forked Head*	8. *Expander*	11. *Cylinder Head Bolt and Nut*
3. *Piston and Rod*	6. *Follower*	9. *Release Spring*	12. *Gasket*
4. *Back Head*	7. *Packing Leather*	10. *Follower Stud and Nut*	13. *Plug*

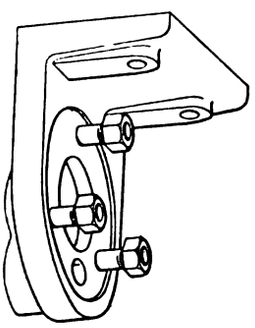


FIG. 978.
BRACKET FOR QUICK ACTION TRIPLE VALVE.

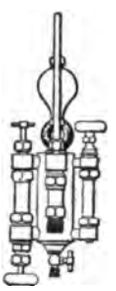


FIG. 979.
AIR PUMP LUBRICATOR.

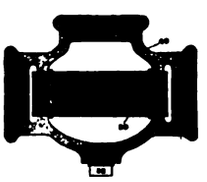


FIG. 980.
SPECIAL DRAIN CUP.

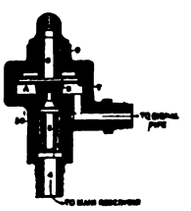
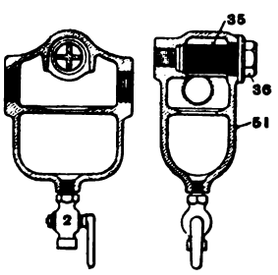


FIG. 981.
REDUCING VALVE FOR AIR SIGNAL PIPE.



FIGS. 982-983.
TENDER DRAIN CUP.

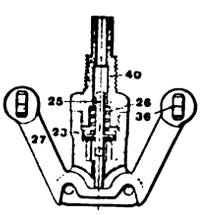


FIG. 984.
SPECIAL RELEASE VALVE.

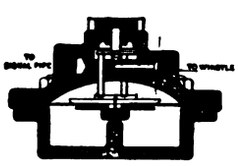


FIG. 985.
SIGNAL VALVE.

NAMES OF PARTS. FIGS. 972-973.

37. *Body*	35. *Strainer*	
3. *Union Swivel*	36. *Expander*	
4. *Union Nut*	32. *Plug*	
5. *Gasket*		

NAMES OF PARTS. FIG. 980.

49. *Body*	32. *Drain Plug*
50. *Strainer*	

NAMES OF PARTS. FIGS. 982-983.

51. *Body*	35. *Strainer*
2. *Drain Cock*	36. *Expander*

NAMES OF PARTS. FIG. 981.

NAMES OF PARTS. FIG. 974.

12. *Body*	16. *Valve*
13. *Handle*	17. *Pin*
14. *Cap*	

2. *Body*	7. *Diaphragm*
3. *Spring Cap*	8. *Diaphragm Nut*
4. *Valve Stud*	9. *Diaphragm Spring*
5. *Supply Valve*	10. *Supply-Valve Spring*
6. *Diaphragm Plate*	

NAMES OF PARTS. FIG. 984.

23. *Cylinder*	36. *Handle Cotter*
25. *Vent Valve*	40. *Stud*
26. *Spring*	

NOTE. OTHER PARTS OF NEW YORK AIR BRAKE CO.'S EQUIPMENT ARE PRACTICALLY THE SAME AS THE WESTINGHOUSE AIR BRAKE CO.'S PARTS SHOWN IN FIGS. 891-958.

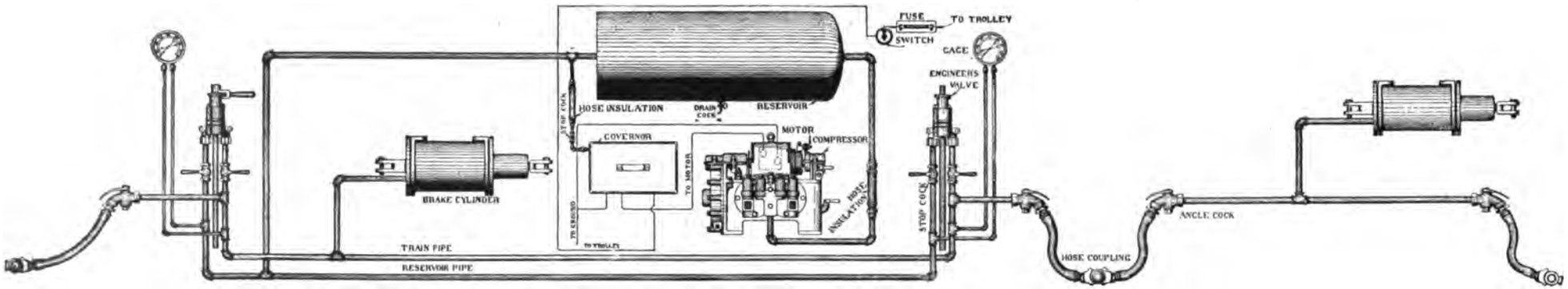


FIG. 986. DIAGRAM OF PIPING AND CONNECTIONS FOR CHRISTENSEN STRAIGHT AIR BRAKE EQUIPMENT FOR ELECTRIC CARS.

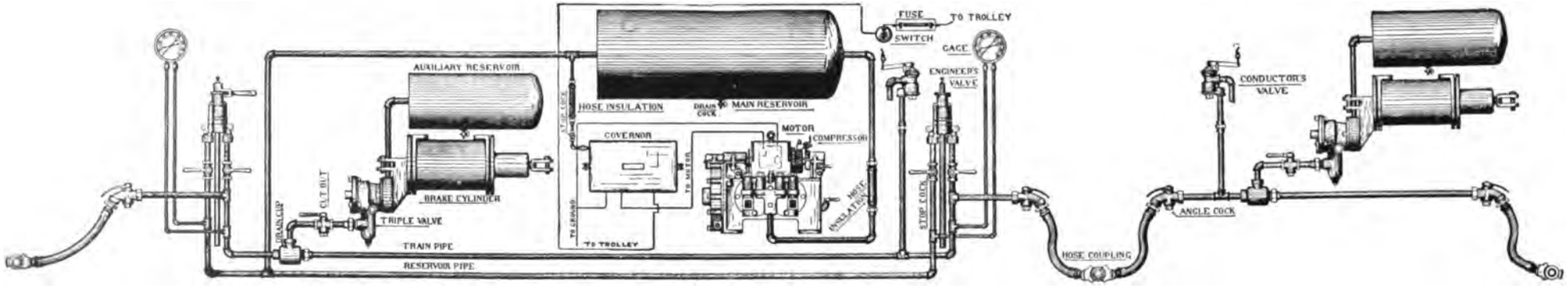
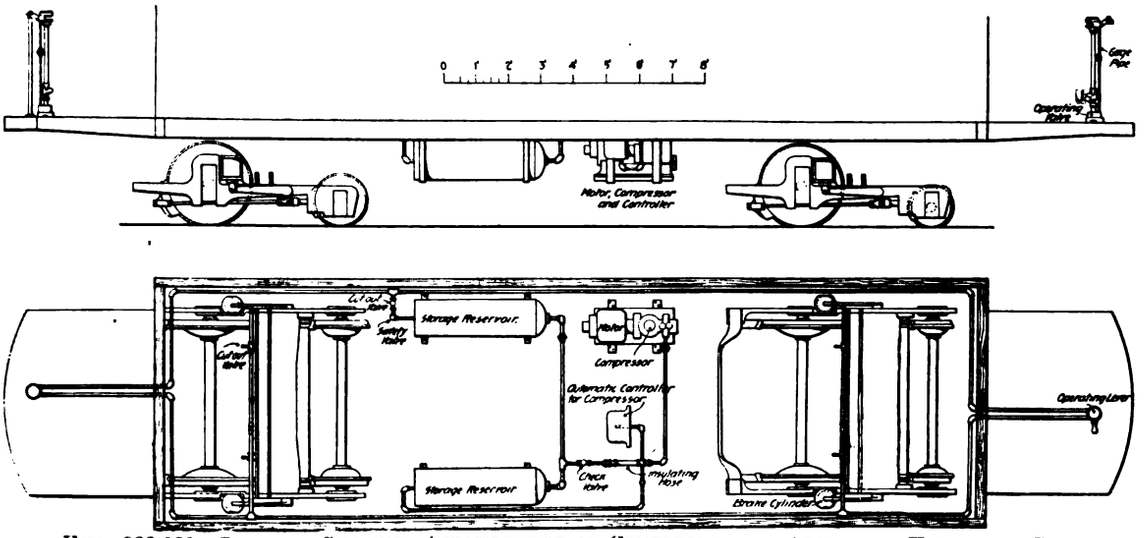


FIG. 987. DIAGRAM OF PIPING AND CONNECTIONS FOR CHRISTENSEN AUTOMATIC QUICK ACTION AIR BRAKE EQUIPMENT FOR ELECTRIC CARS.
CHRISTENSEN ENGINEERING CO.

TABLE OF SIZES, MOTOR DRIVEN AIR COMPRESSORS, FIGS. 990-992.

Pump No	Cylinder size. inches.	Gear speed r.p.m.	Displacement cubic feet free air per minute.	Armature speed, r.p.m.	H.P. at 90 lbs.	—Amperes.— Amount.	Fuse.	—Dimensions, inches.— Length.	Width.	Height.	—Weights, pounds.— Pump.	Motor.	Total.
D-1	5 x 2.17	238	11.71	1,300	3.3	5	5	25.5	23.00	18.37	363	237	600
D-2	5.5 x 4.25	183	21.44	1,200	5.3	8	10	31.88	27.06	21.00	493	392	885
D-3	7 x 5	131	29.1	875	7.15	11	12	34.31	27.69	22.06	675	550	1,225

NOTE.—D-1 and D-2 pumps have ¾-inch suction and ½-inch discharge; D-3 pumps have 1-inch suction and ¾ inch discharge. Standard motors are wound for 550 volts direct current.



FIGS. 988-989. DIAGRAM SHOWING ARRANGEMENT OF COMPRESSOR AND APPARATUS UNDER THE CAR.

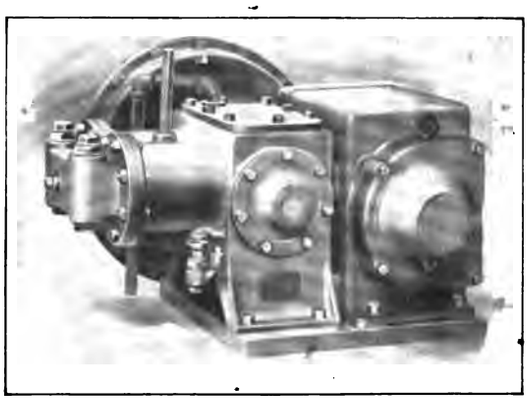


FIG. 990.

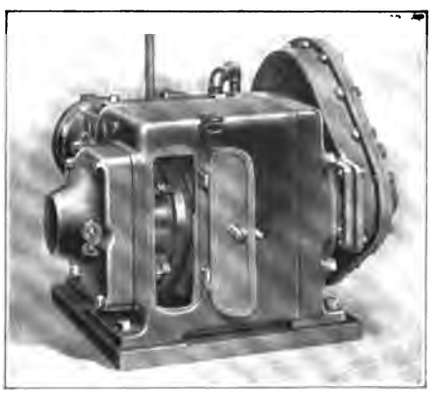


FIG. 991.

MOTOR DRIVEN AIR COMPRESSOR.

FIG. 994.
OPERATING VALVE.

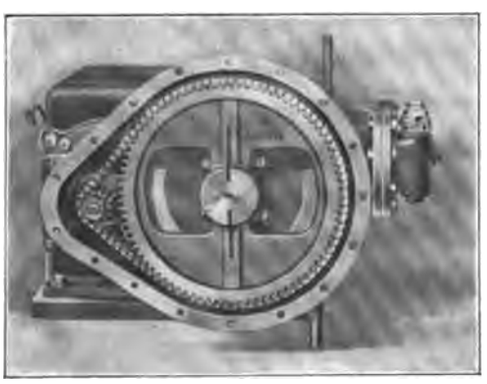


FIG. 992. MOTOR DRIVEN AIR COMPRESSOR WITH GEAR CASE REMOVED.

FIG. 993. OPERATING VALVE, HEAD AND GAGE.

FIG. 995. ELECTRIC PUMP GOVERNOR.

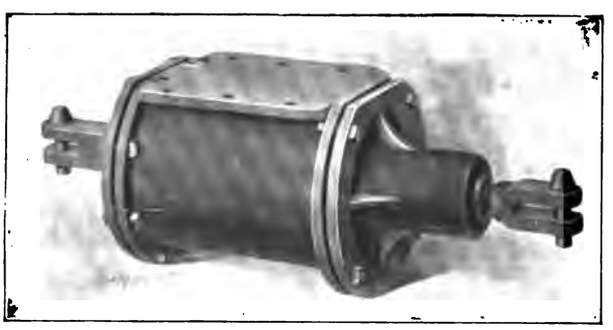


FIG. 996. BRAKE CYLINDER.

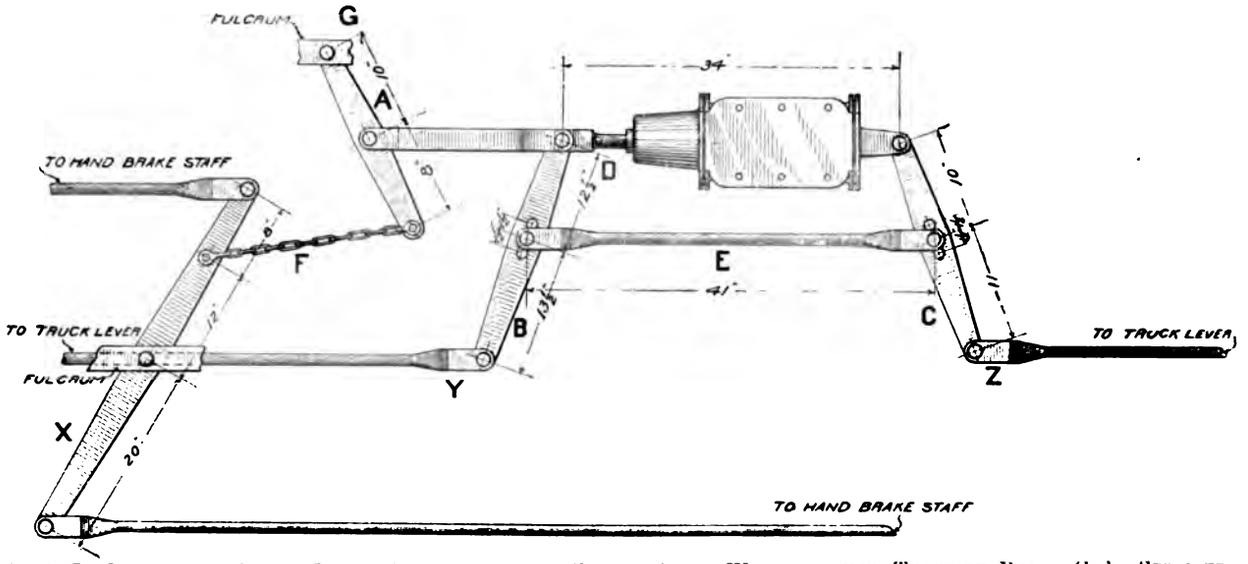


FIG. 997. DIAGRAM OF BRAKE LEVER CONNECTIONS FOR STREET CARS. WESTINGHOUSE TRACTION BRAKE CO.'S STRAIGHT AIR BRAKE EQUIPMENT.

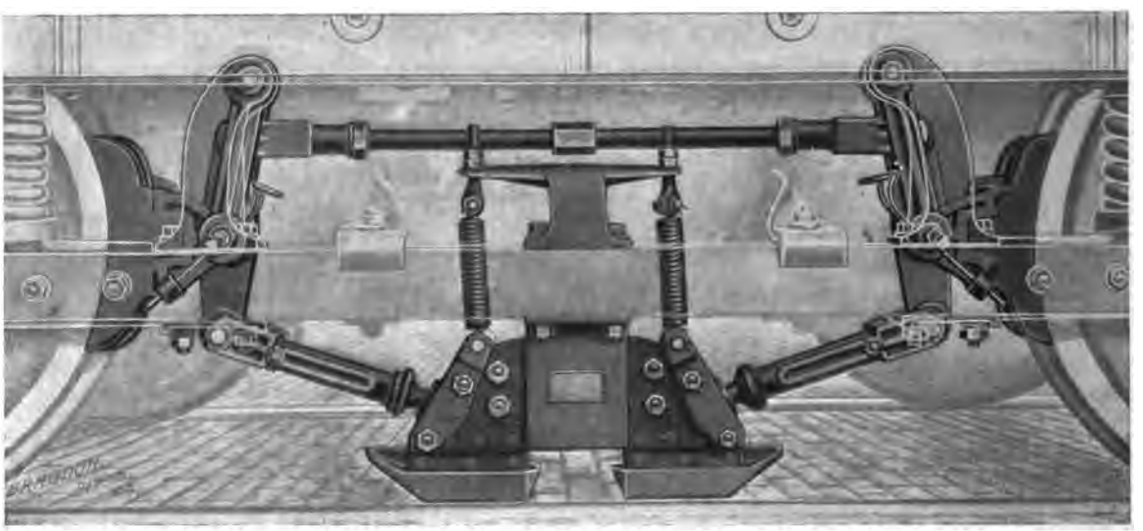


FIG. 998. MAGNETIC TRACK SHOE BRAKE AS APPLIED TO STREET CARS. WESTINGHOUSE TRACTION BRAKE CO.

FIG. 999.

FIG. 1000.

FIG. 1001.

FIG. 1002.

THE INTERLOCKING BRAKE SHOE.
MANUFACTURER'S RAILWAY SUPPLY CO., MAKERS.

Flanged and Un-Flanged Brake Shoes. American Brake Shoe & Foundry Co.

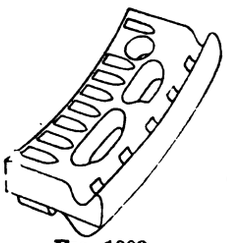
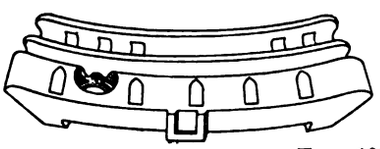
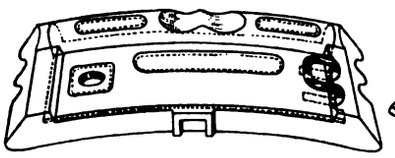


Fig. 1003.
Sargent Steel Insert Shoe. C. I. Body, C. S. Inserts.





Figs. 1004-1004a.
The "Perfecto" Driver Brake Shoe, Steel Back, Wrought Iron Hook, Steel Inserts.

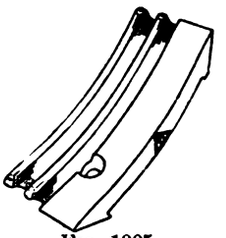


Fig. 1005.
Ross or Skeleton "U" Shoe. C. S. or Diamond "S" Inserts. Chilled Ends.

Fig. 1006.
Sargent Shoe. Cast Steel.

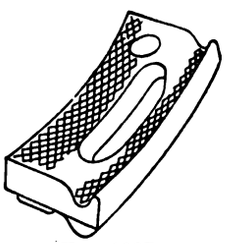


Fig. 1007.
Diamond "S" Shoe. C. I. Body, Expanded Metal Inserts.

Fig. 1008.
Streeter Steel Back Shoe. C. I. Body, Hard Iron Insert.

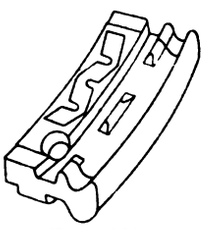


Fig. 1009.
Corning Soft Insert Shoe. Hard C. I. Body, Soft C. I. Insert.

Fig. 1010.
Herron Reinforced Insert Shoe. Reinforced Back. Special Inserts.

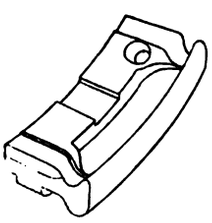


Fig. 1011.
Lappin Shoe. Chilled Sections. Steel Back.

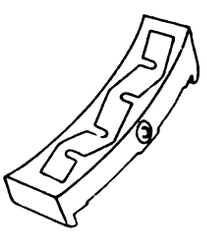


Fig. 1012.
Corning Shoe. Soft Cast Iron Insert.

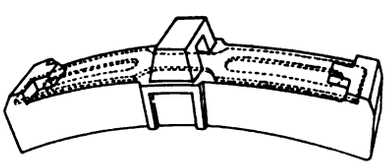


Fig. 1013.
Steel Back Coach Shoe.

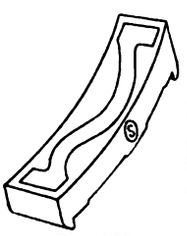


Fig. 1014.
Streeter Shoe. Hard Iron Insert.

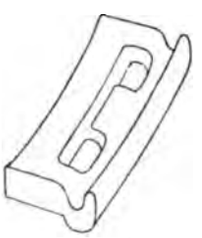


Fig. 1015.
Flanged Coach Brake Shoe. Made in any Type.

Fig. 1016.
Diamond "S" Shoe. Expanded Metal Inserts.

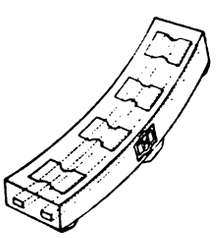


Fig. 1017.
Herron Reinforced Shoe. Special Inserts.

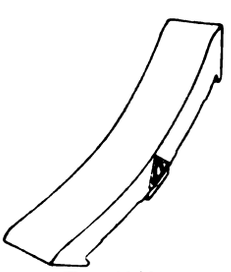


Fig. 1018.
"U" Shoe. Ends Chilled from the Back.

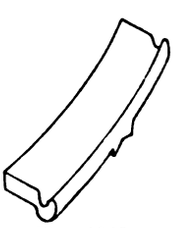


Fig. 1019.
Street Car Shoes. Made in any Type.

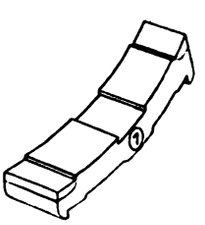


Fig. 1020.
Lappin Shoe. Chilled Sections. Steel Back.

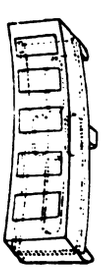


Fig. 1021.
Steel Back Congdon Shoe. W. I. Inserts.

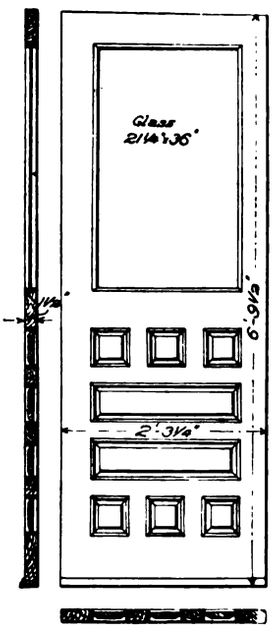
Fig. 1022.

Fig. 1023.

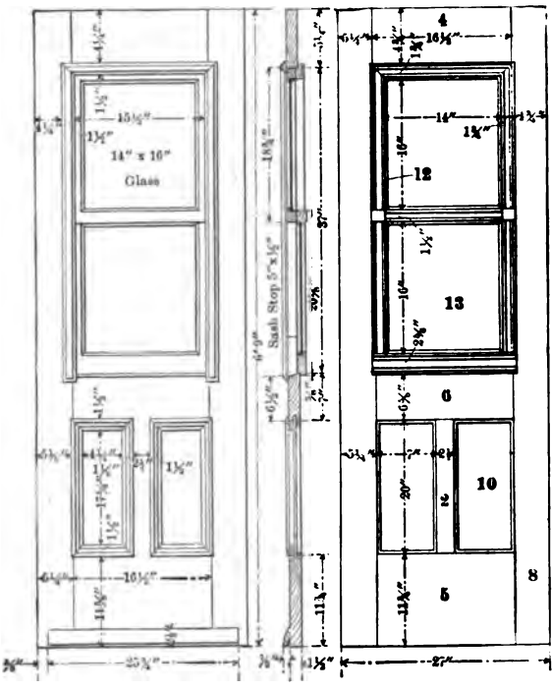
Fig. 1024.

Fig. 1025.
Wheel Truing Brake-Shoe with Flange. Abrasive Insert. Wheel Truing Brake-Shoe Co.

The Compo Brake-Shoe. Cork Inserts. National Brake-Shoe Co., Makers.



FIGS. 1026-1028.
END DOOR OF COACH.
N. & W.



FIGS. 1029-1031. STANDARD END DOOR OF COACH.
N. Y., N. H. & H.

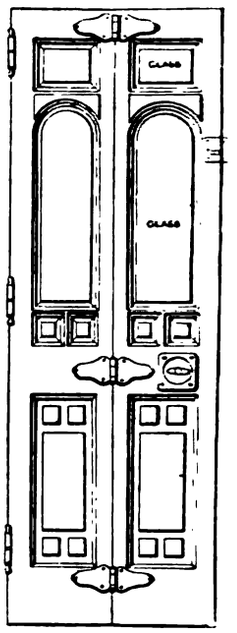


FIG. 1032.
DOOR FOR GOULD
NARROW VESTIBULE.

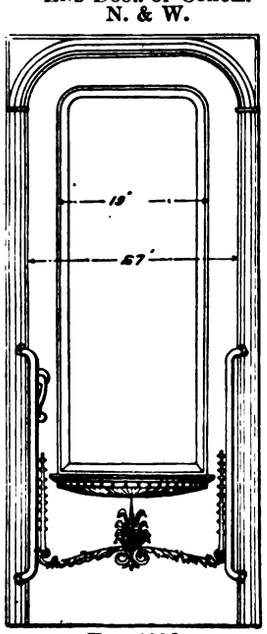


FIG. 1033.
DOOR FOR PULLMAN
WIDE VESTIBULE.

NAMES OF PARTS OF DOORS.

FIGS. 1029-1037.

1. *Door Post or Jamb*
2. *Door Mullion*
4. *Top Door Rail*
5. *Bottom Door Rail*
6. *Middle or Lock Door Rail*
7. *Parting Door Rail*
8. *Door Stile*
10. *Lower or Twin Door Panels*
11. *Middle Door Panel*
12. *Upper Door Sash*
13. *Lower Door Sash*
21. *Door Hanger*
22. *Door Hook*
23. *Door Guards*

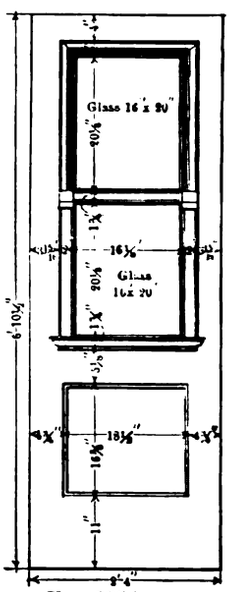


FIG. 1034.
STANDARD END DOOR FOR
PULLMAN CARS.

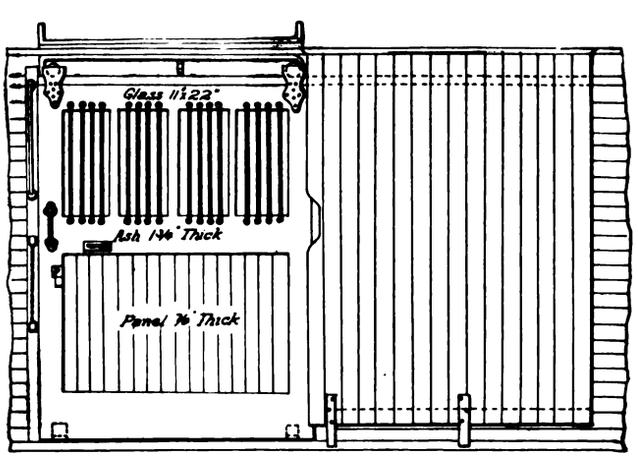
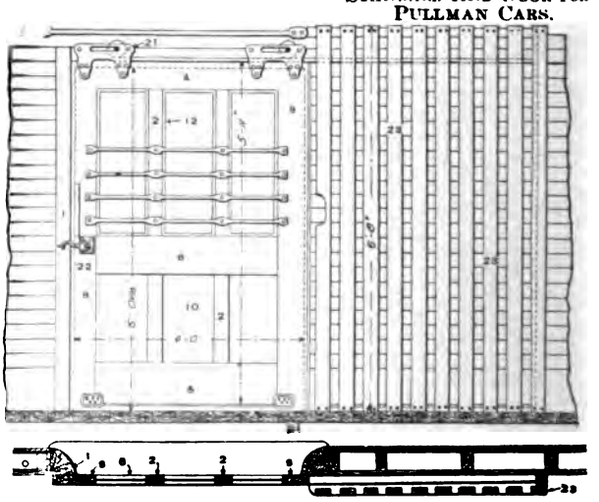
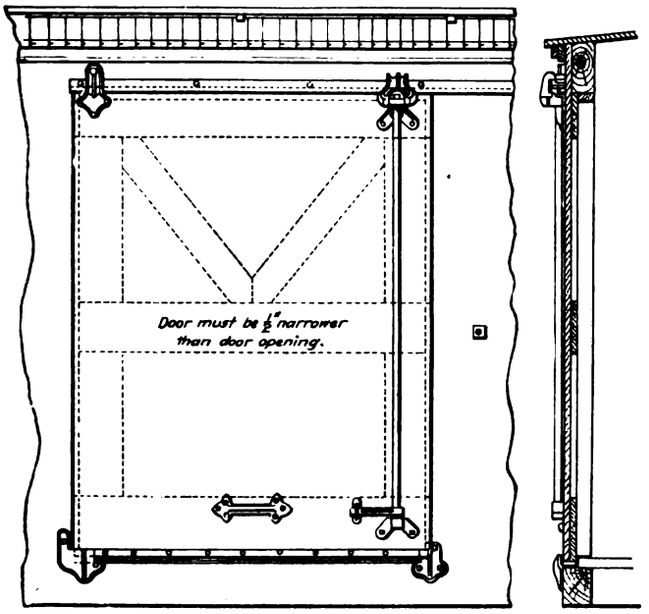


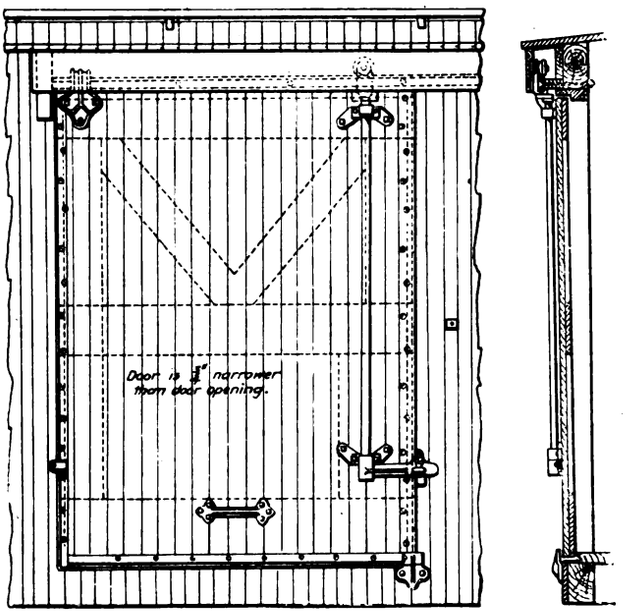
FIG. 1035. BAGGAGE CAR SIDE DOOR. N. Y. C. & H. R.



FIGS. 1036-1037. BAGGAGE CAR SIDE DOOR. N. & W.

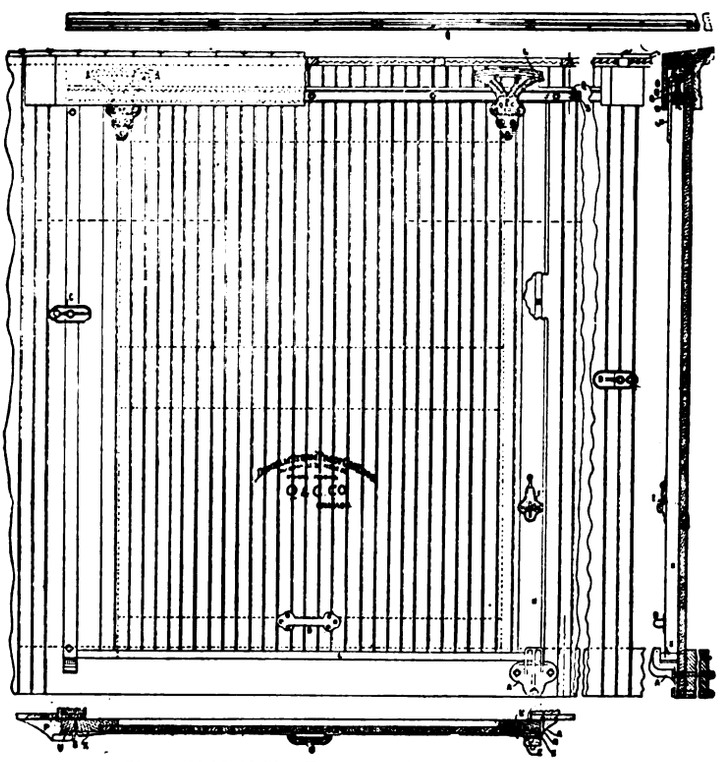


FIGS. 1038-1039. WESTERN FLUSH CAR DOOR.



FIGS. 1040-1041. ST. LOUIS FLUSH CAR DOOR.

WESTERN RAILWAY EQUIPMENT CO., MAKERS.



FIGS. 1042-1044. DUNHAM STORM PROOF CAR DOOR. NATIONAL RAILWAY SPECIALTY CO.

FIGS. 1045-1046.
DOOR HANGER AND WHEEL.

FIG. 1047.
DOOR GUIDE.

FIG. 1048.
WEDGE STOP.

FIG. 1049.
DOUBLE DOOR WEDGE

FIG. 1050.

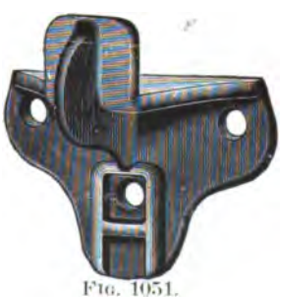


FIG. 1051.

SECURITY DOOR BRACKETS.

CHICAGO GRAIN DOOR CO., MAKERS.

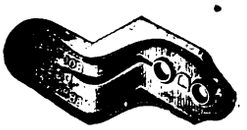
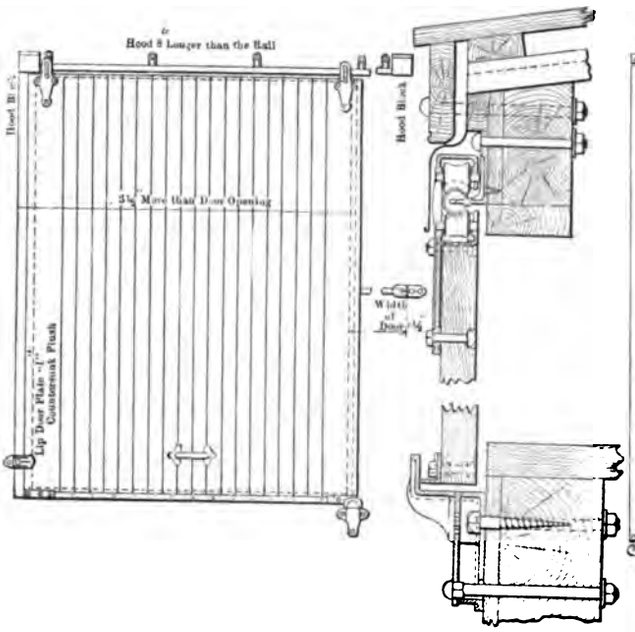
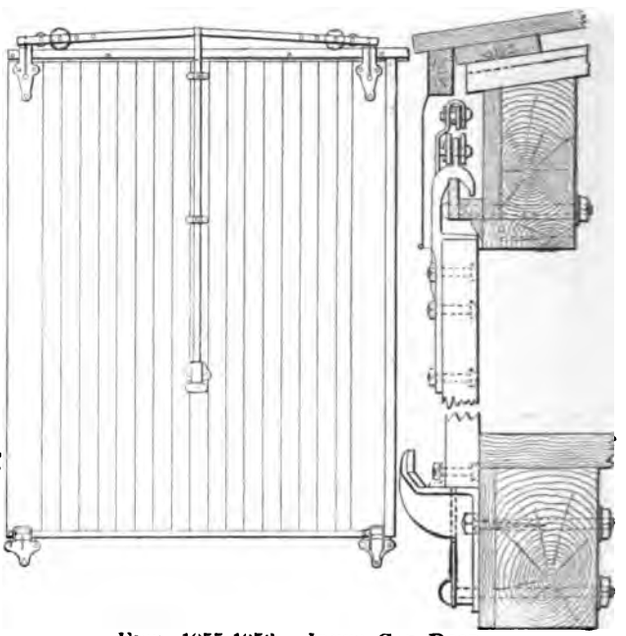


FIG. 1052.
DOOR STEP BRACKET.

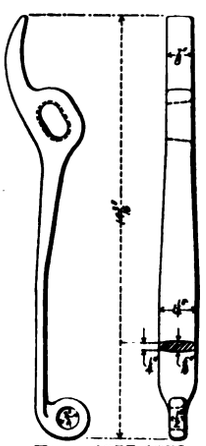
DUNHAM DOOR FIXTURES.



FIGS. 1053-1054. SMITH CAR DOOR.
SMITH CAR DOOR CO., MAKERS.



FIGS. 1055-1056. JONES CAR DOOR.
JONES CAR DOOR CO., MAKERS.



FIGS. 1057-1058.
OPENING LEVER.

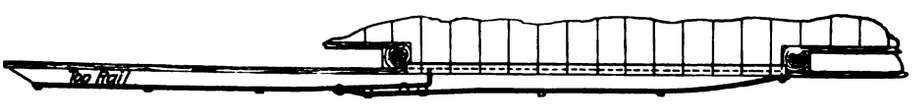
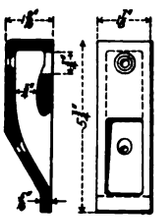
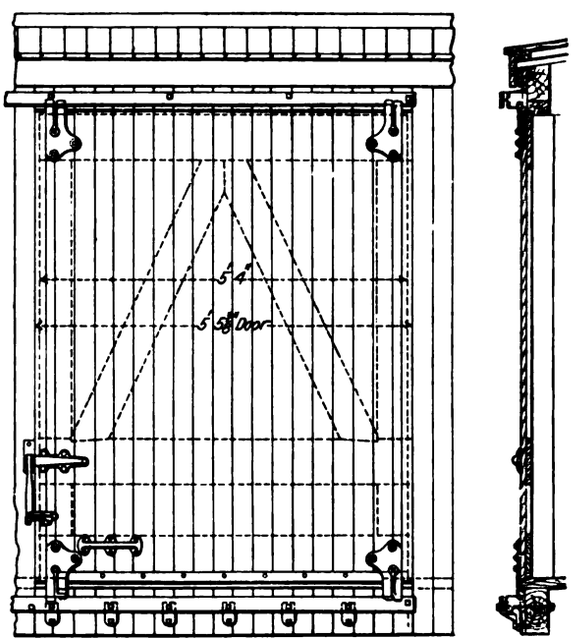


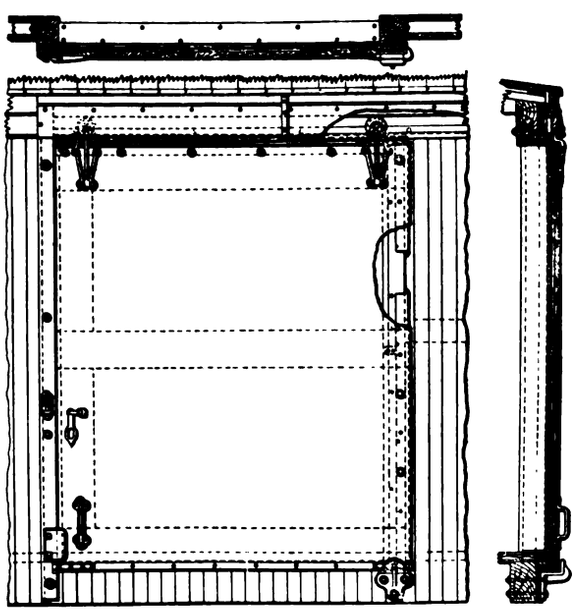
FIG. 1059. TOP PLAN.



FIGS. 1060-1061.
LEVER SOCKET.



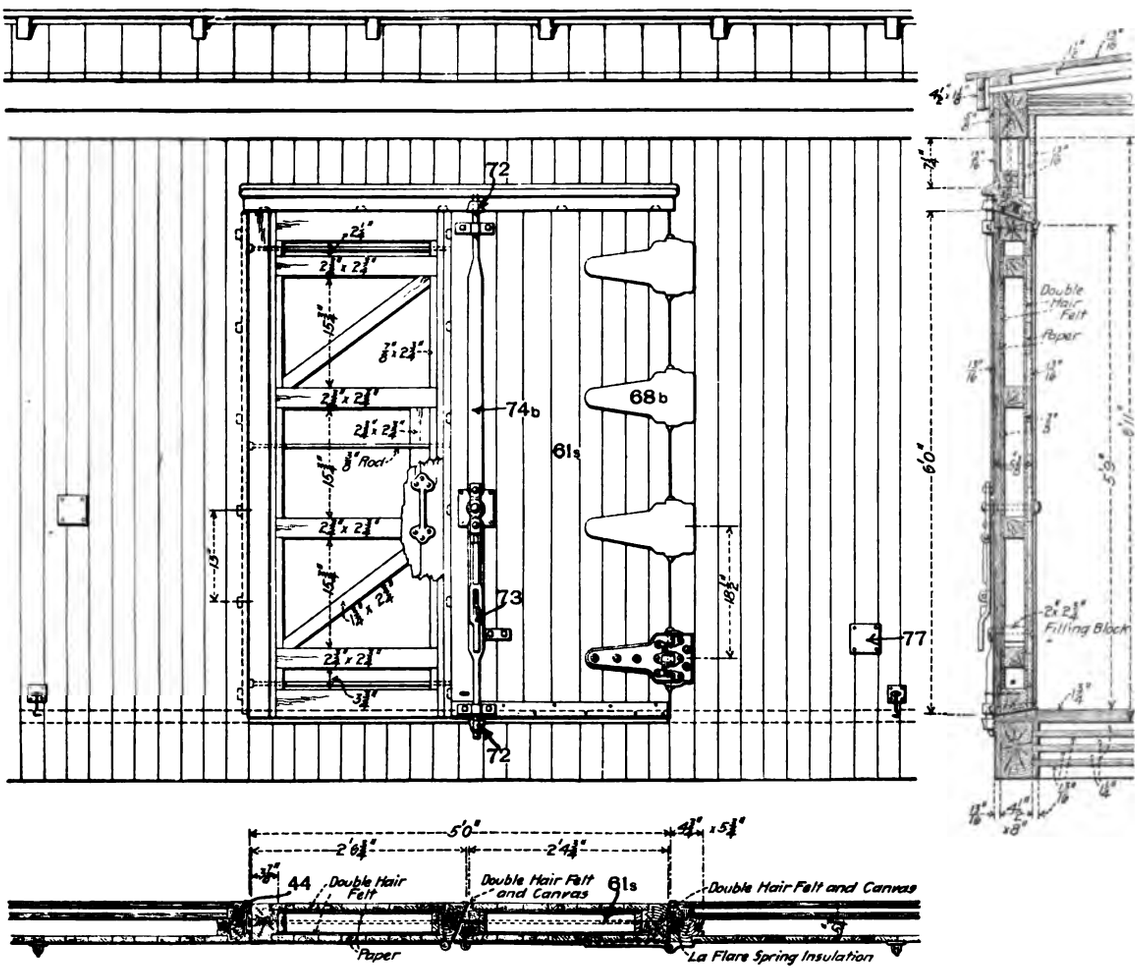
FIGS. 1065-1066. HOKE FLUSH CAR DOOR.
HOKE CAR DOOR CO., MAKERS.



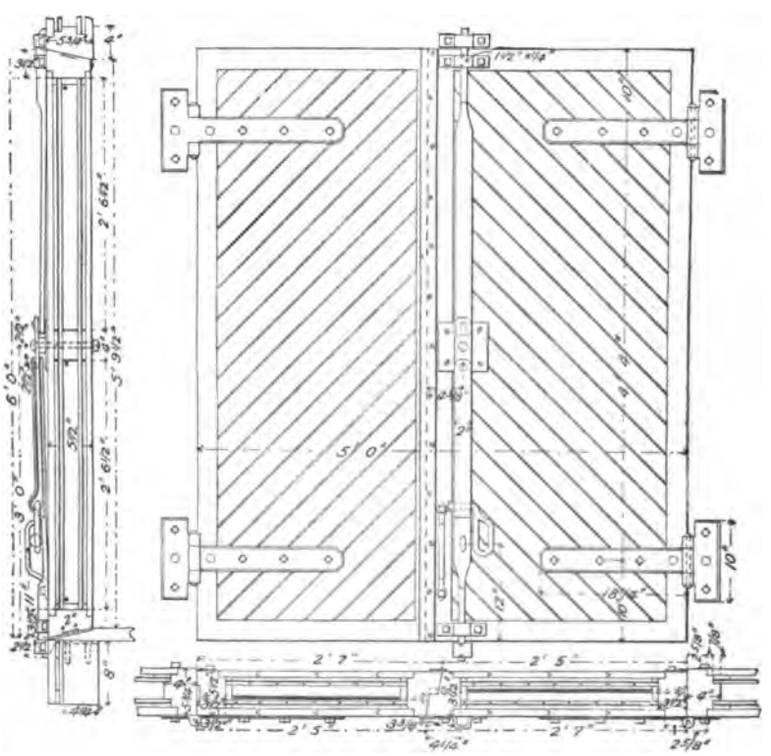
FIGS. 1062-1064. SECURITY CAR DOOR.
NATIONAL RAILWAY SPECIALTY CO., MAKERS.

NAMES OF PARTS. FIGS. 1067-1069.

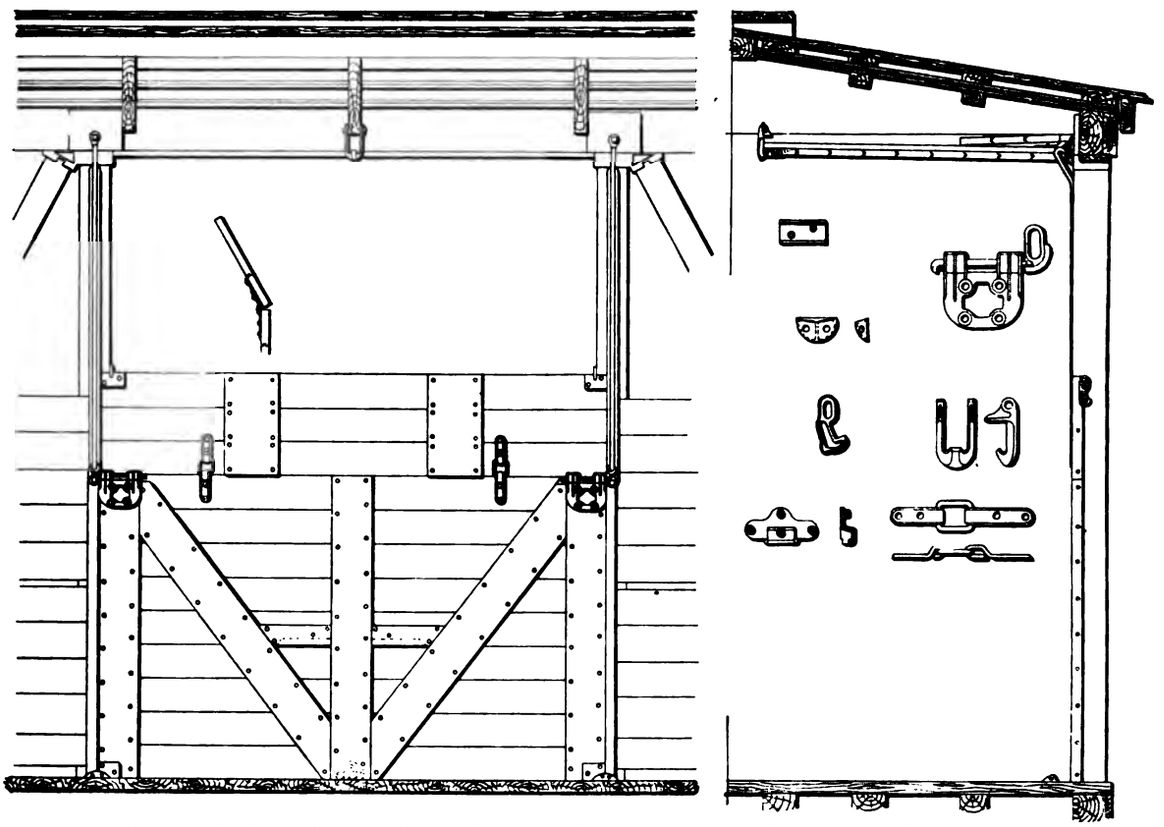
44. *Door Post*
61s. *Door*
68b. *Door Hinge*
72. *Door Bolt Bracket*
73. *Door Hasp*
74b. *Door Bolt or Bar*
77. *Door Stop*



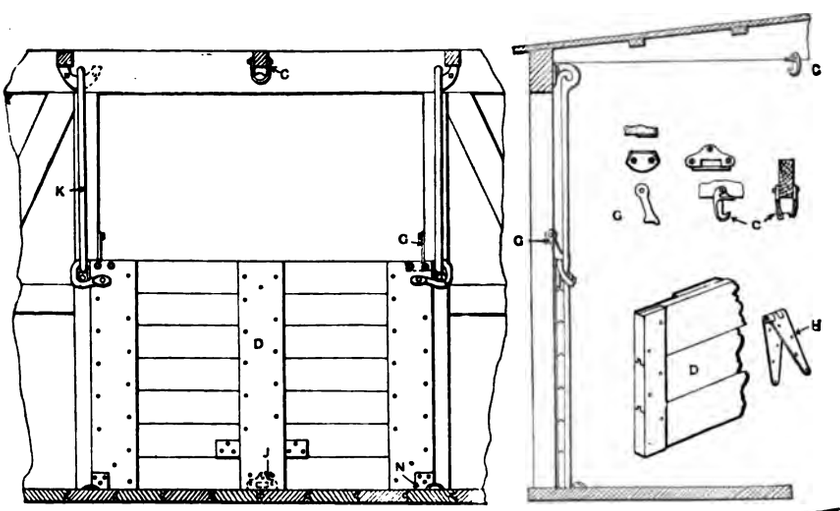
FIGS. 1067-1069. SIDE DOOR WITH LA FLARE SPRING INSULATION. PRODUCE CAR. N. Y. C. & H. R.



FIGS. 1070-1072. REFRIGERATOR CAR DOOR. WICKES PATENT.

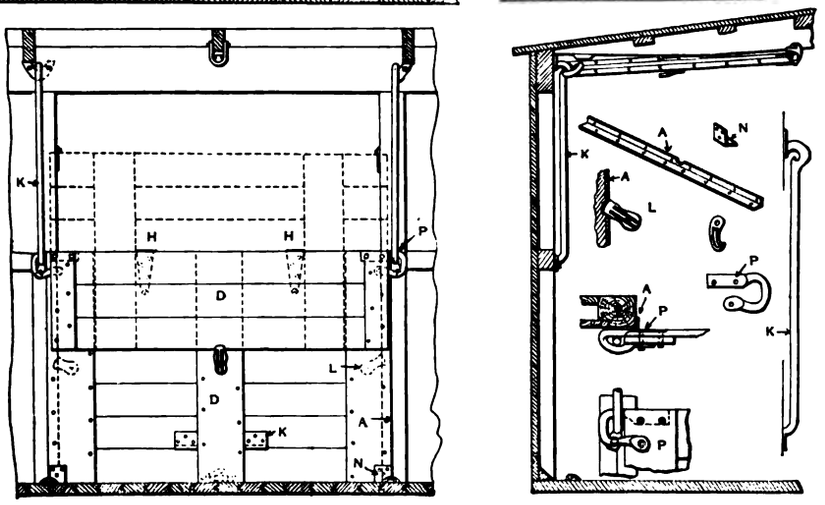


FIGS. 1073-1086. CHICAGO GRAIN DOOR AND PARTS. CHICAGO GRAIN DOOR CO., MAKERS.



NAMES OF PARTS OF MCGUIRE DOOR FIGS. 1087-1106.

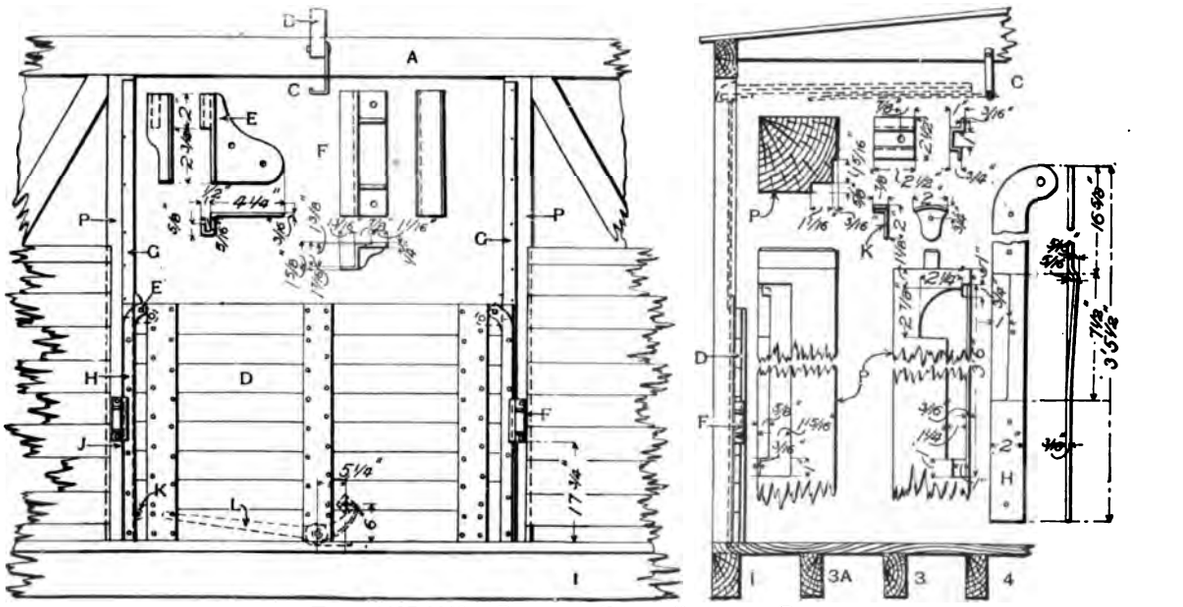
- **A.** *Door Post Angle Iron*
- **C.** *Overhead Door Catch or Hook*
- **D.** *Grain Door*
- **G.** *Door Keeper or Dog*
- **H.** *Double Door Hinge*
- **J.** *Door Fulcrum*
- **K.** *Grain Door Rod*
- **L.** *Door Button Head*
- **N.** *Door Shoe*
- **P.** *Door Arm*



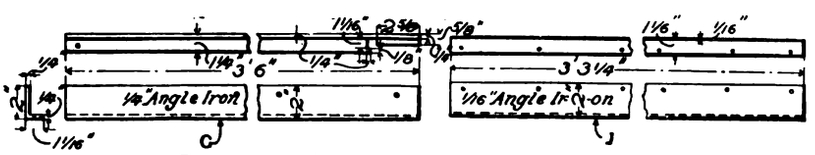
NAMES OF PARTS OF DESATUR GRAIN DOOR. FIGS. 1107-1137.

- **A.** *Plate*
- **B.** *Carline*
- **C.** *Overhead Catch*
- **D.** *Grain Door*
- **E.** *Door Guide*
- **F.** *Inside Door Stop*
- **G.** *Post Angle Iron*
- **H.** *Door Rubbing Plate*
- **J.** *Door Post Angle Iron*
- **K.** *Dog to block door sidewise*
- **L.** *Operating Lever*
- **P.** *Door Post*
- **1.** *Side Sill*
- **3a.** *Outer Intermedicte Sill*
- **3.** *Intermediate Sill*
- **4.** *Center Sill*

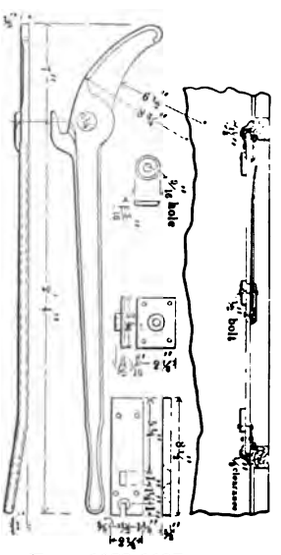
FIGS. 1087-1106. MCGUIRE GRAIN DOOR. MCGUIRE MANUFACTURING CO., MAKERS.



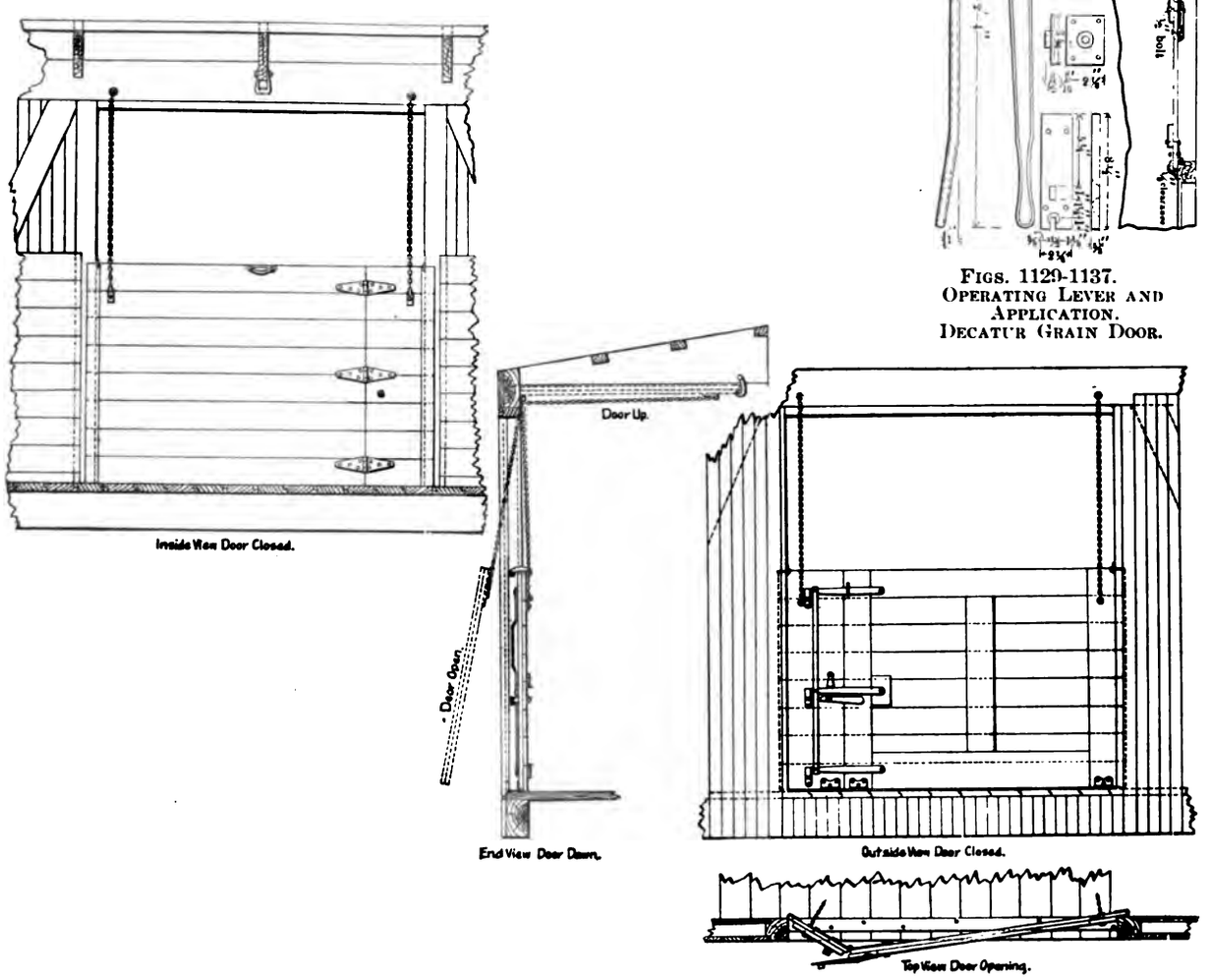
FIGS. 1107-1123. DECATUR GRAIN DOOR AND PARTS.



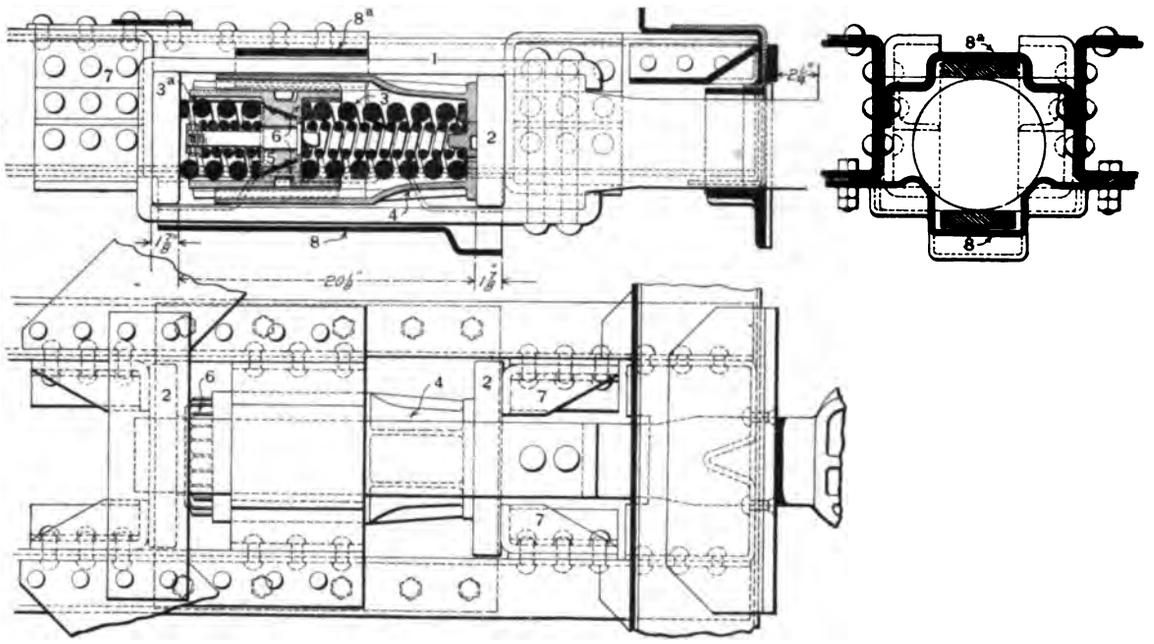
FIGS. 1124-1128. DOOR POST ANGLE IRONS.



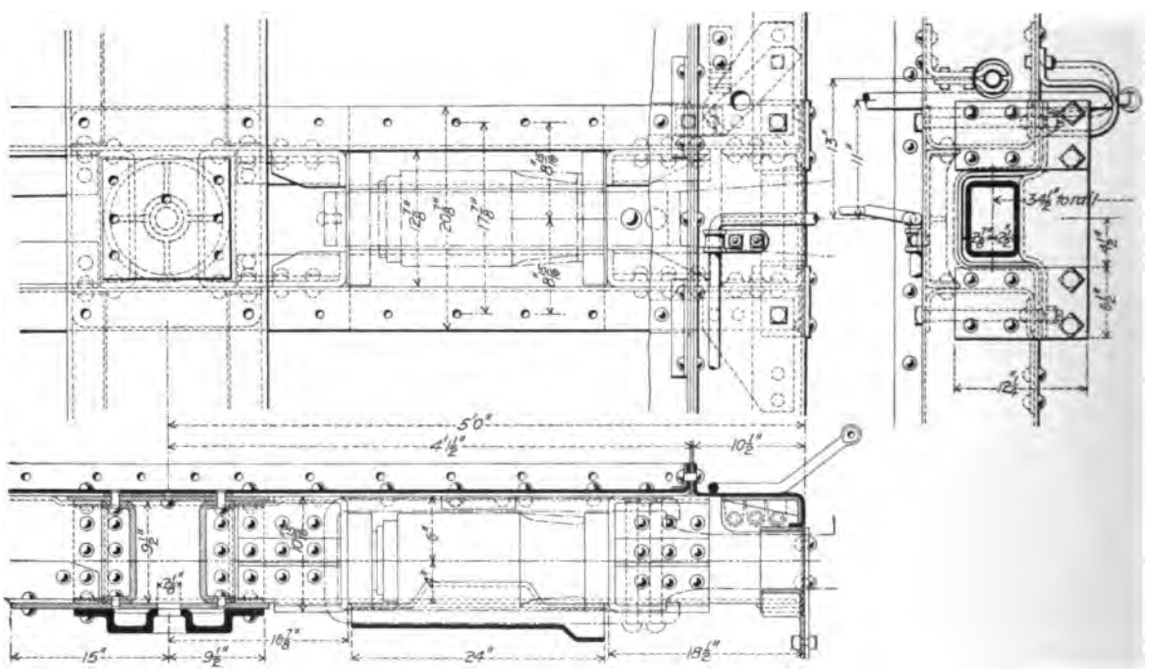
FIGS. 1129-1137.
OPERATING LEVER AND APPLICATION.
DECATUR GRAIN DOOR.



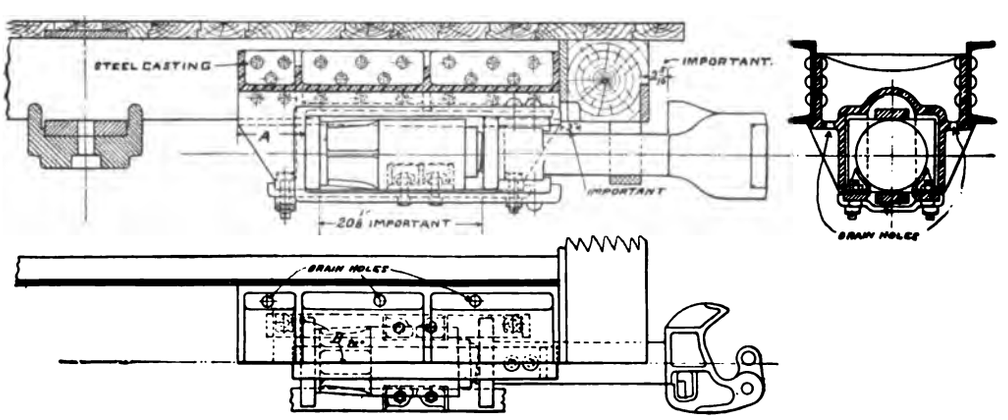
FIGS. 1138-1141. JACQUEMIN GRAIN DOOR.
STANDARD RAILWAY EQUIPMENT CO.



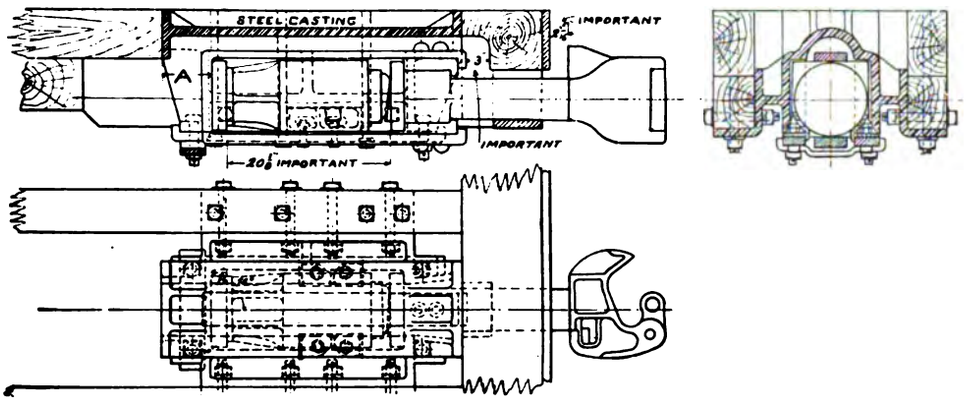
FIGS. 1142-1144. APPLICATION OF WESTINGHOUSE FRICTION DRAFT GEAR TO CARS WITH PRESSED STEEL SILLS. WESTINGHOUSE AIR BRAKE CO.



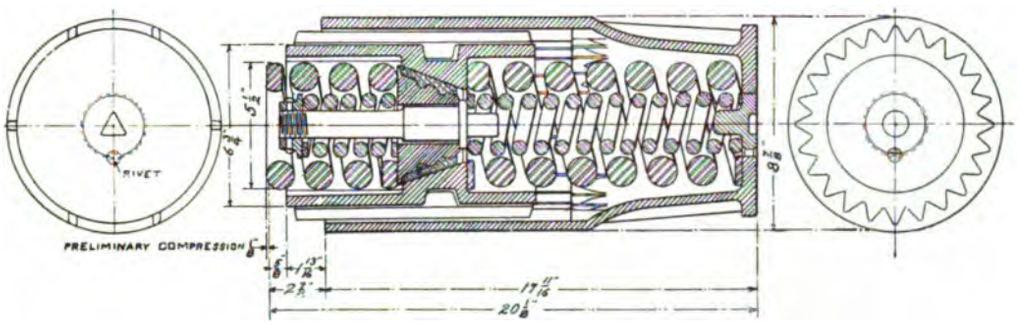
FIGS. 1145-1147. APPLICATION OF WESTINGHOUSE FRICTION DRAFT GEAR TO 100,000 LB. STEEL GONDOLA. P. R. R. WESTINGHOUSE AIR BRAKE CO.



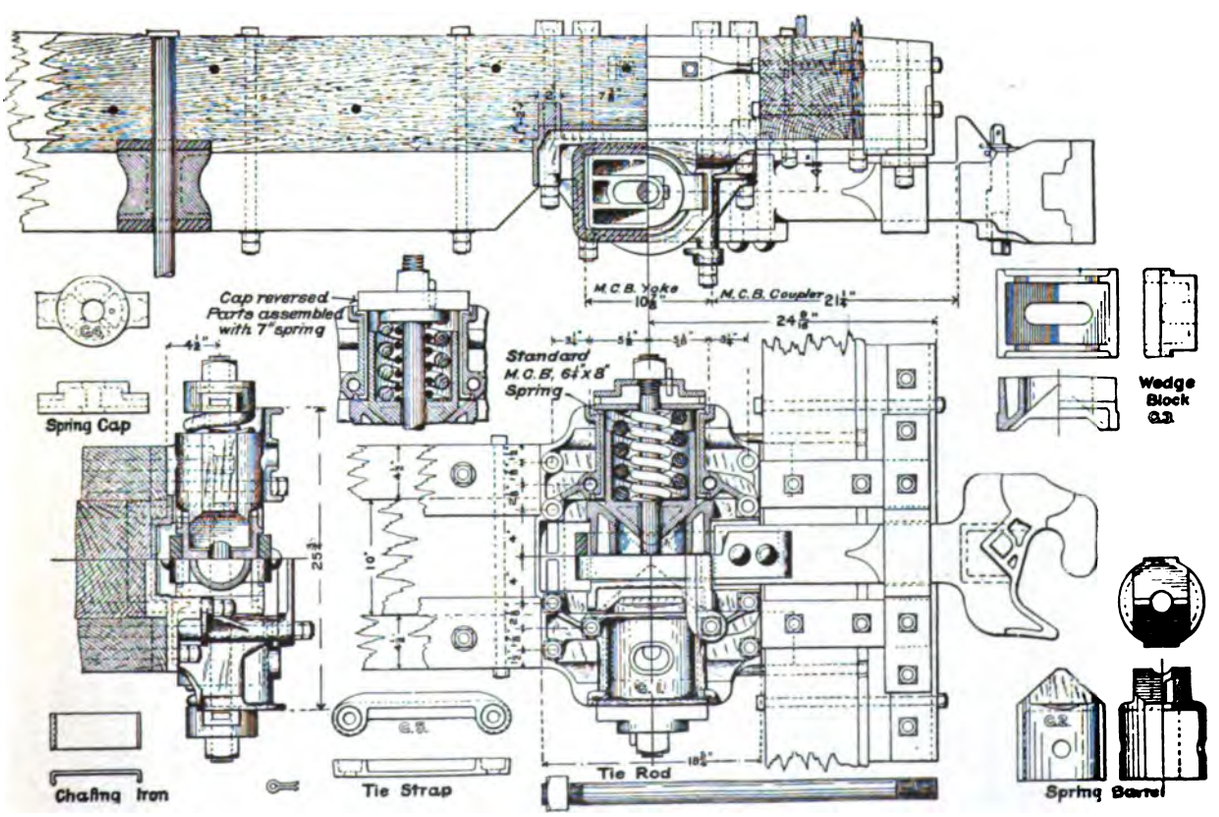
FIGS. 1148-1150. ATTACHMENT OF WESTINGHOUSE FRICTION DRAFT GEAR TO CARS WITH METAL SILLS WESTINGHOUSE AIR BRAKE CO.



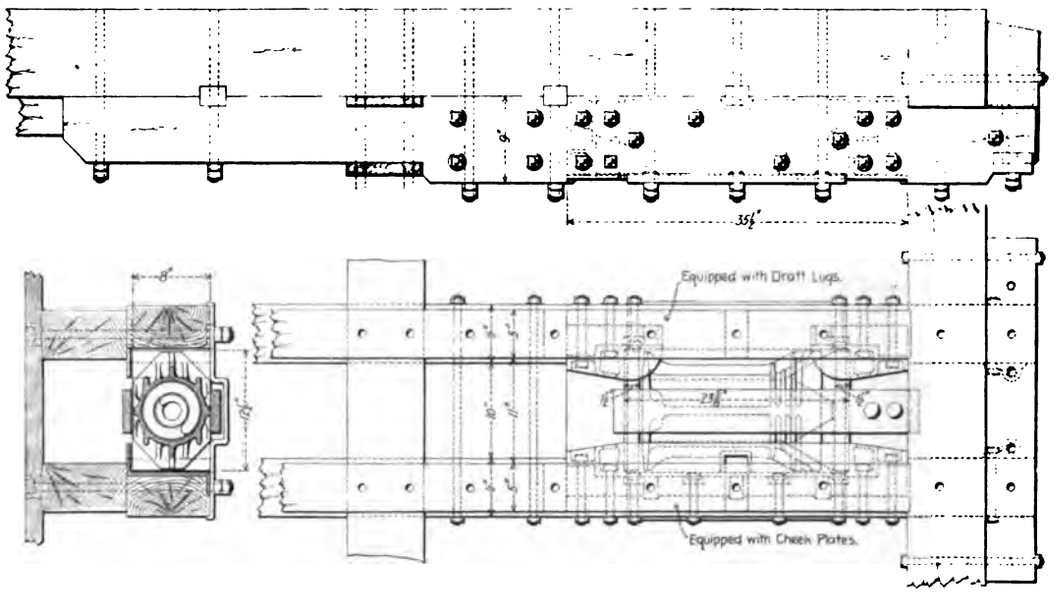
FIGS. 1151-1153. ATTACHMENT OF WESTINGHOUSE FRICTION DRAFT GEAR.
WESTINGHOUSE AIR BRAKE CO.



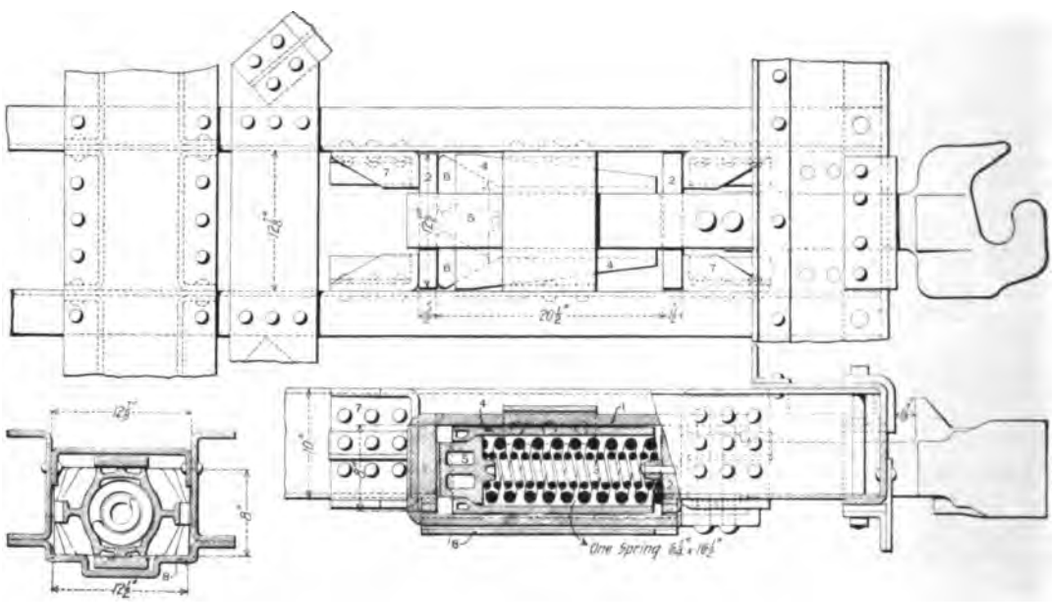
FIGS. 1154-1156. CROSS SECTION AND END ELEVATION OF WESTINGHOUSE FRICTION DRAFT GEAR.
WESTINGHOUSE AIR BRAKE CO.



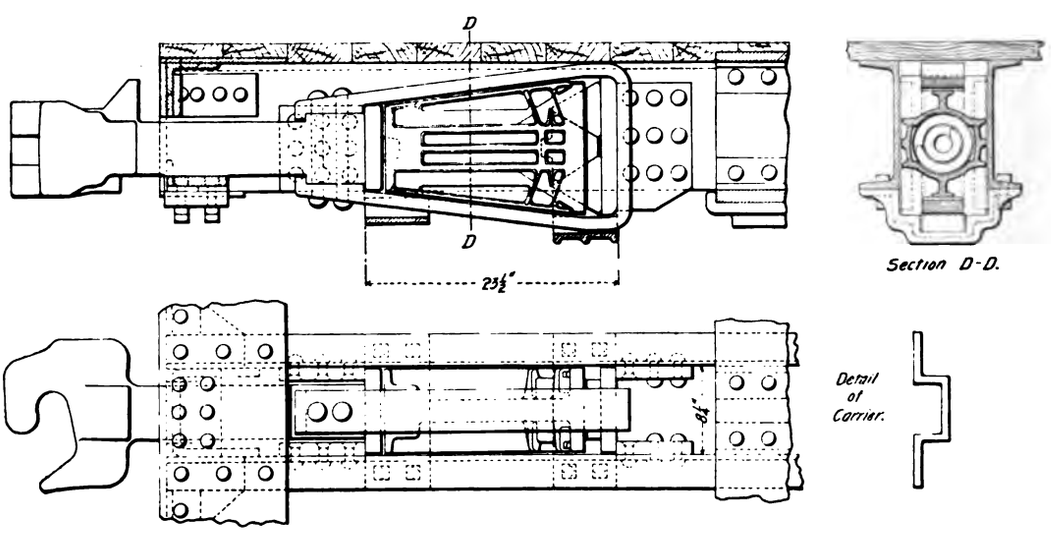
FIGS. 1157-1174. SESSIONS-STANDARD FRICTION DRAFT GEAR AND PARTS, CLASS A.
APPLIED TO WOODEN SILLS. STANDARD COUPLER CO.



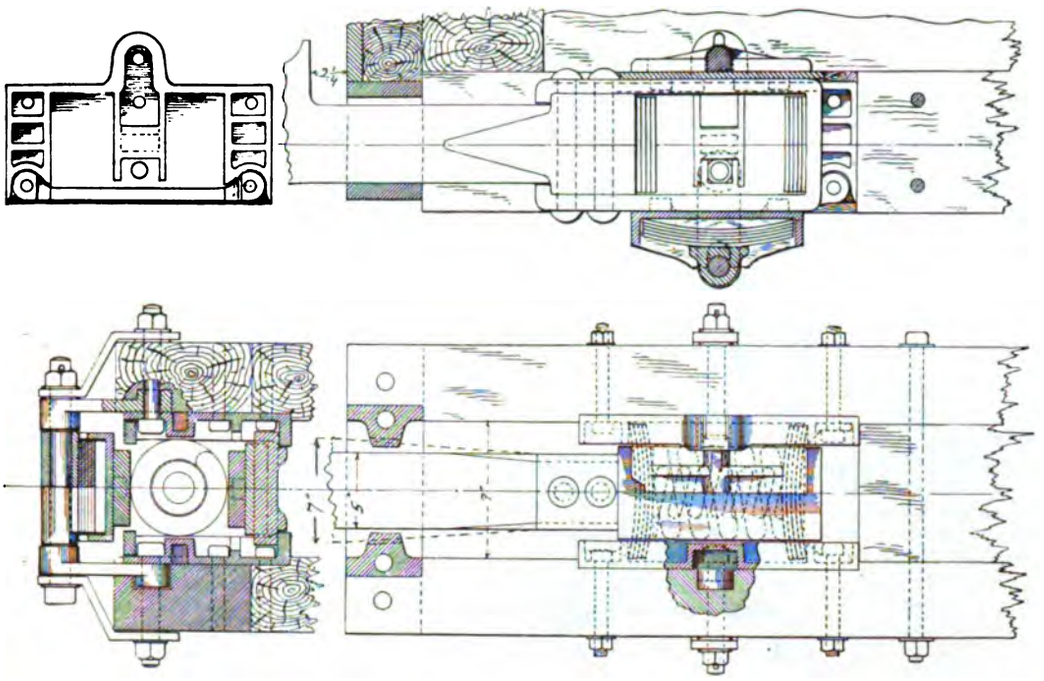
FIGS. 1175-1177.—SESSIONS-STANDARD FRICTION DRAFT-GEAR, CLASS C, APPLIED TO WOODEN SILLS. STANDARD COUPLER CO.



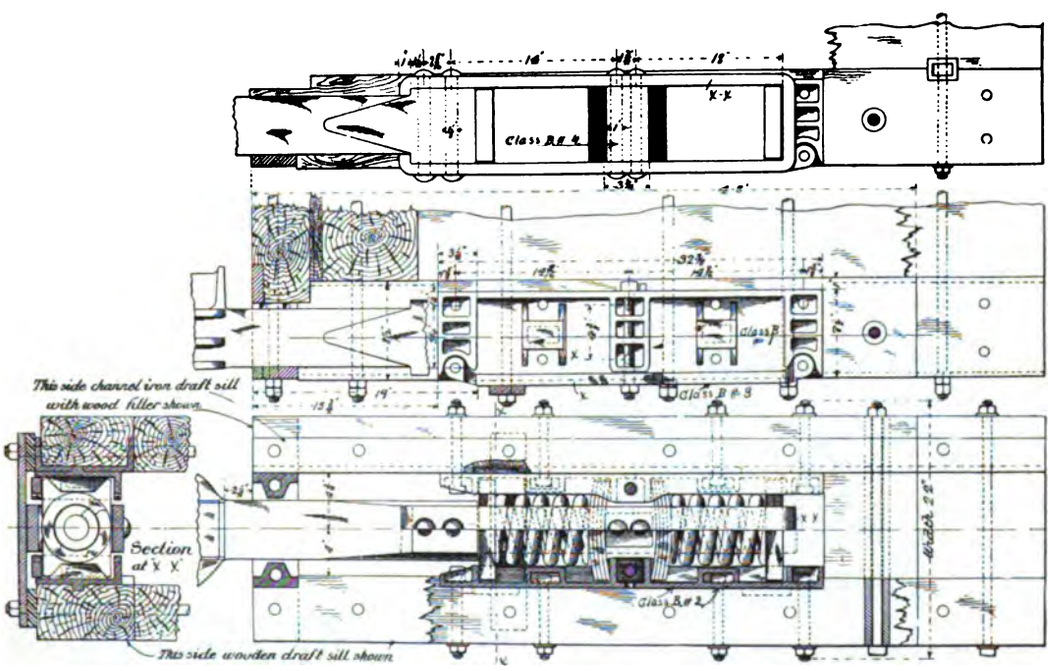
FIGS. 1178-1180. SESSIONS-STANDARD FRICTION DRAFT-GEAR, CLASS C, APPLIED TO STEEL SILLS WITH WIDE SPACING. STANDARD COUPLER CO.



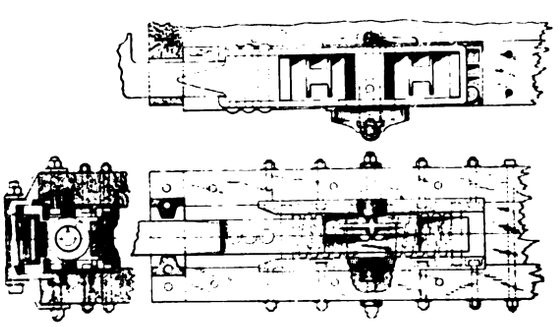
FIGS. 1181-1184. SESSIONS-STANDARD FRICTION DRAFT GEAR, CLASS C, APPLIED TO STEEL SILLS WITH NARROW SPACING. STANDARD COUPLER CO.



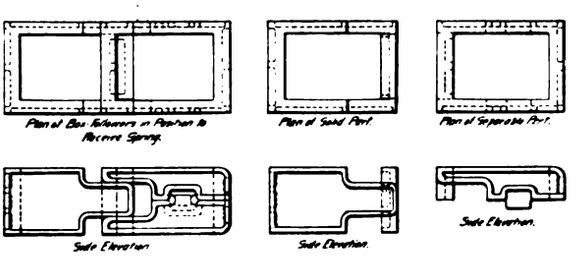
FIGS. 1185-1188. HINSON CLASS J FRICTION DRAFT-GEAR. APPLICATION TO WOODEN SILLS.
NATIONAL CAR COUPLER CO.



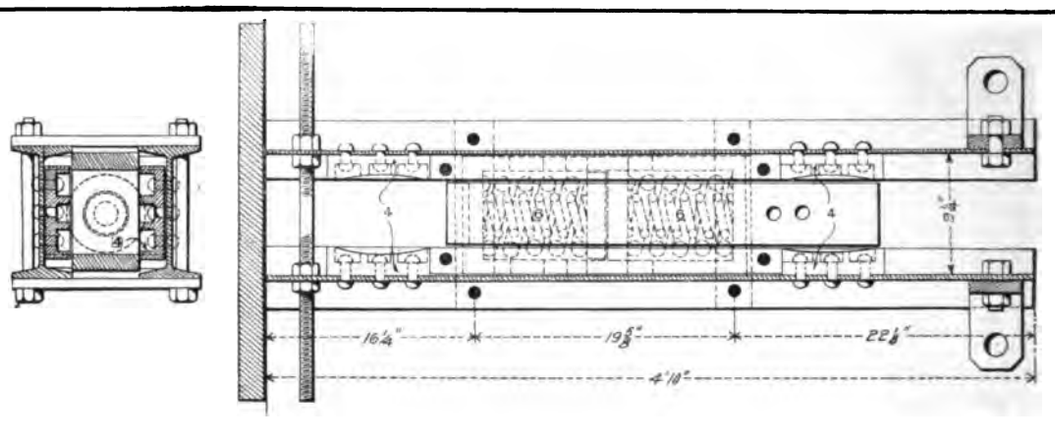
FIGS. 1189-1193. HINSON CLASS B DRAFT-GEAR. APPLIED TO WOODEN SILLS.
NATIONAL CAR COUPLER CO.



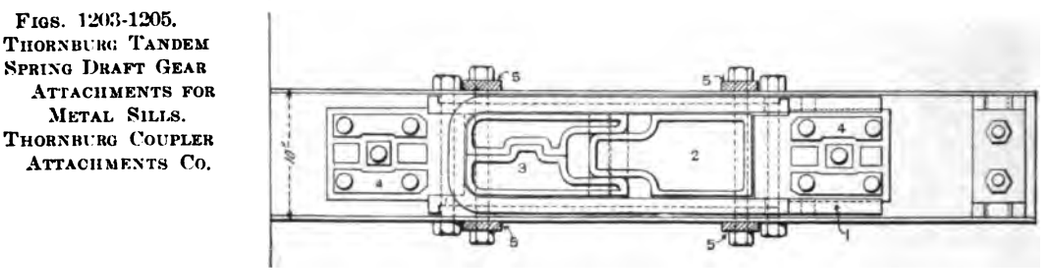
FIGS. 1194-1196. HINSON CLASS K FRICTION DRAFT-GEAR.
NATIONAL CAR COUPLER CO.

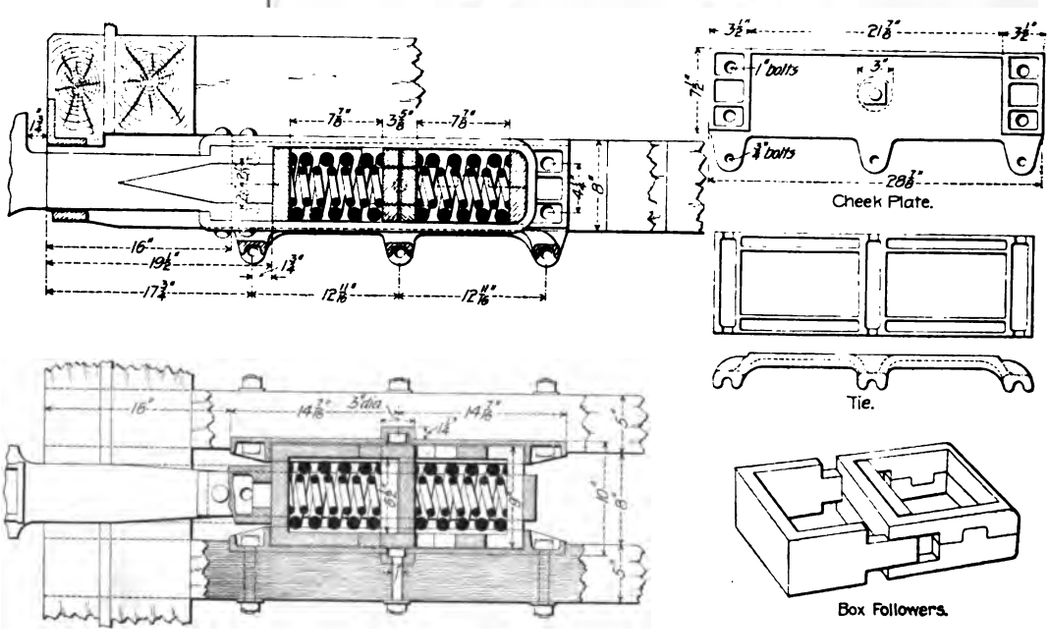


FIGS. 1197-1202. DETAIL OF BOX FOLLOWER THORNBURG DRAFT GEAR. THORNBURG COUPLER ATTACHMENTS CO.

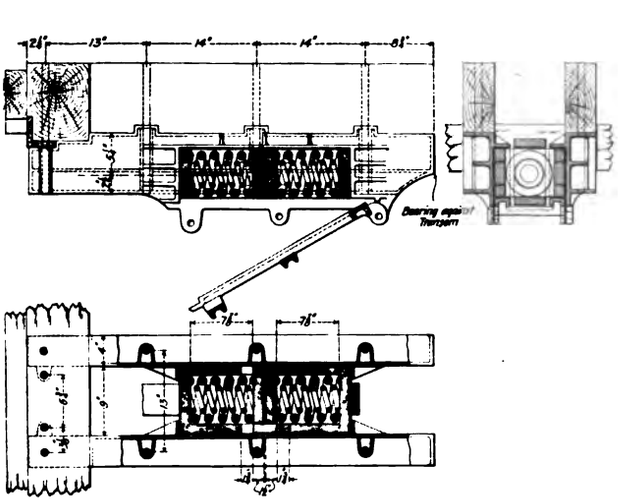


FIGS. 1203-1205. THORNBURG TANDEM SPRING DRAFT GEAR ATTACHMENTS FOR METAL SILLS. THORNBURG COUPLER ATTACHMENTS CO.

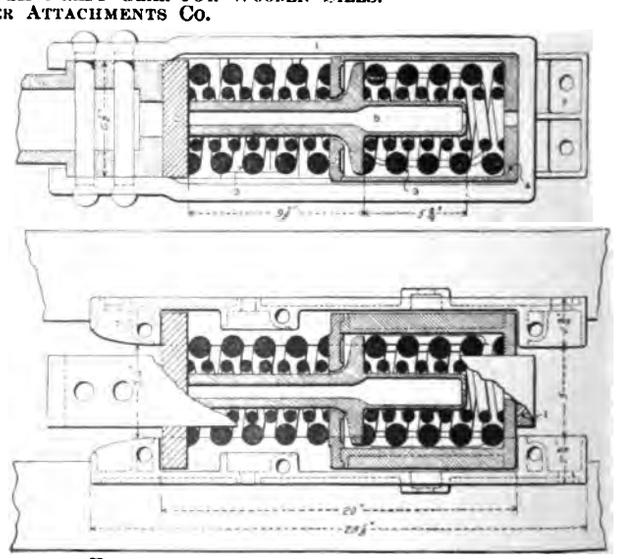




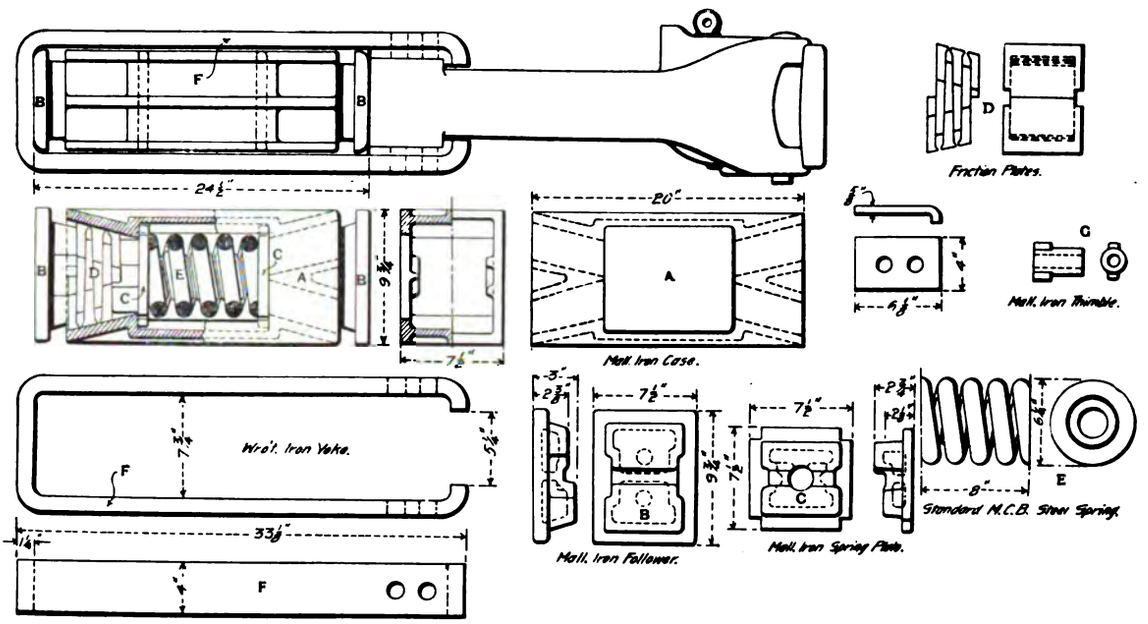
FIGS. 1206-1211. THORNBURG TANDEM DRAFT GEAR FOR WOODEN SILLS. THORNBURG COUPLER ATTACHMENTS CO.



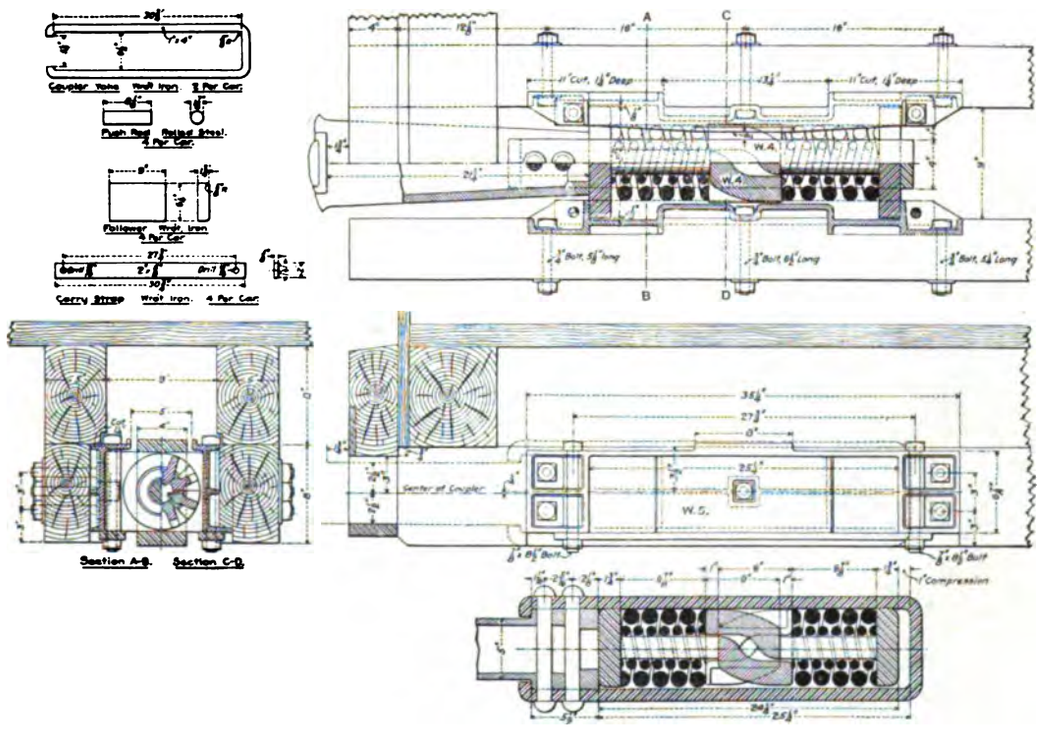
FIGS. 1212-1214. THORNBURG TANDEM DRAFT GEAR WITH METAL DRAFT SILLS. THORNBURG COUPLER ATTACHMENTS CO.



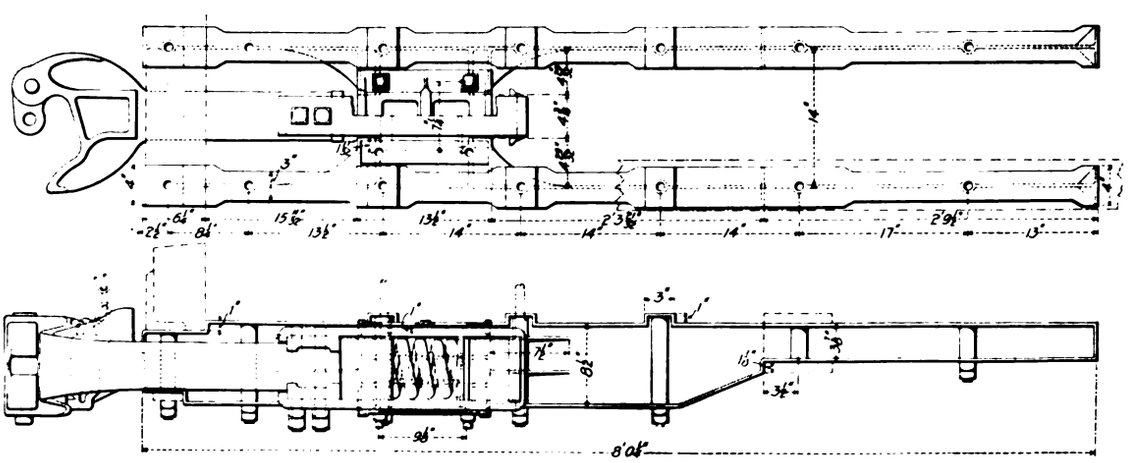
FIGS. 1215-1216. BUTLER TANDEM DRAFT GEAR. BUTLER DRAWBAR ATTACHMENT CO.



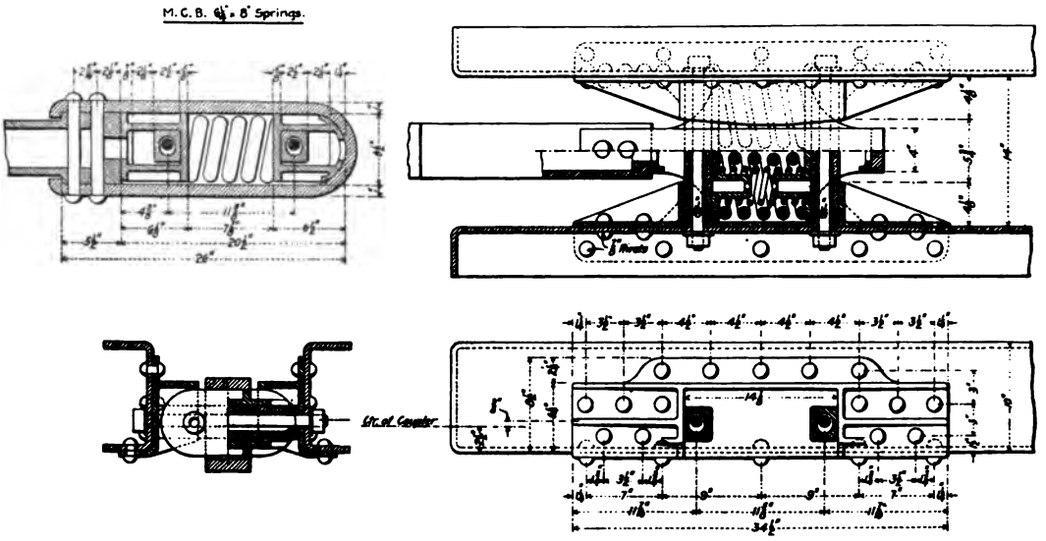
FIGS. 1217-1234. HIEN FRICTION DRAFT GEAR AND PARTS.



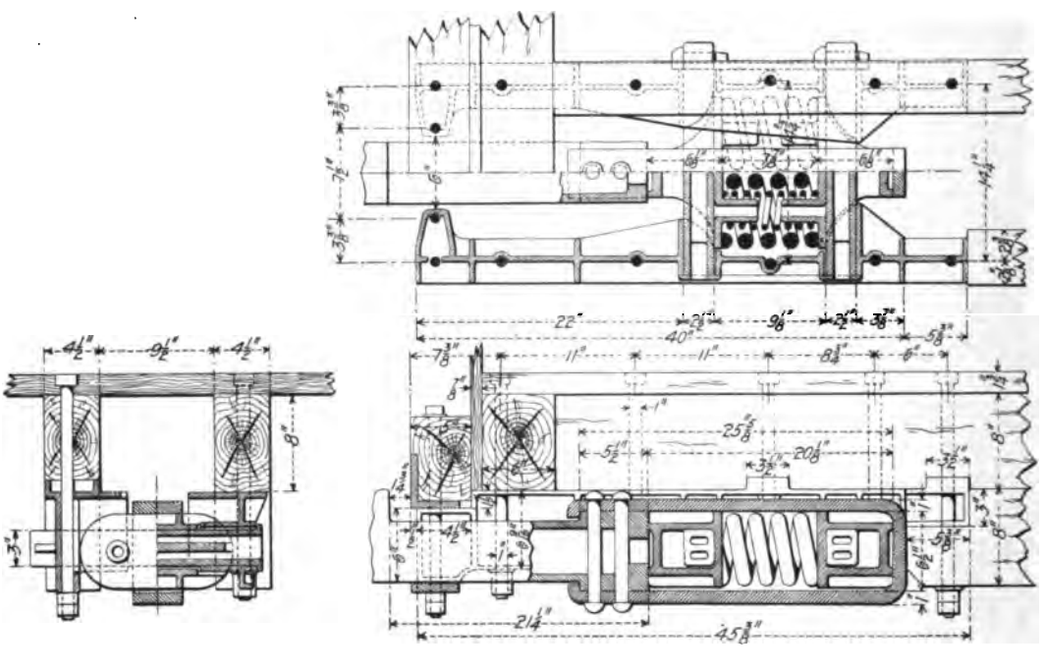
FIGS. 1235-1245. STREET FRICTION DRAFT GEAR. WELLMAN-SEAVER-MORGAN ENGINEERING CO.



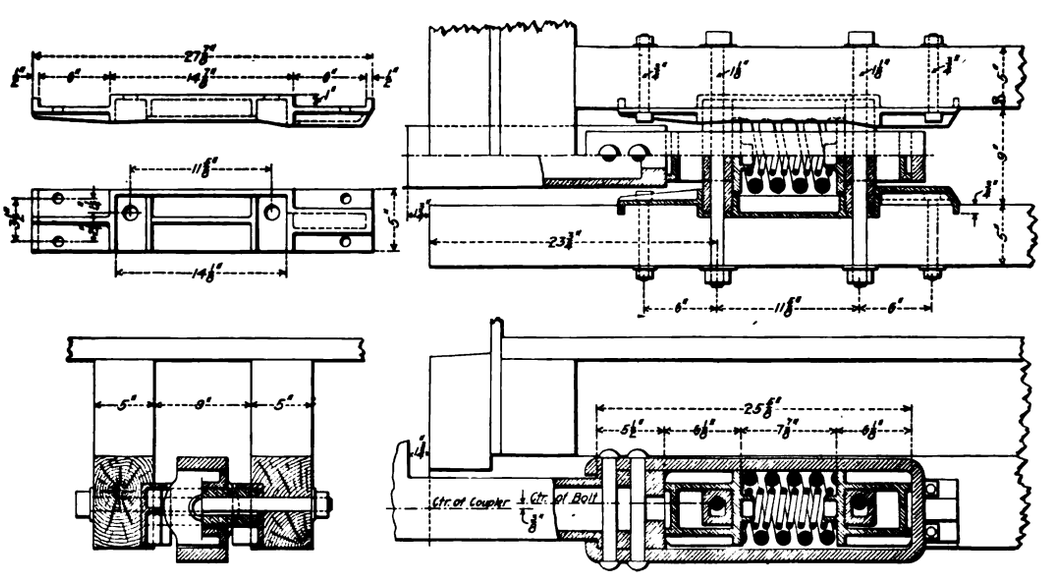
FIGS. 1246-1247. MALLEABLE IRON DRAFT SILLS. TEXAS & NEW ORLEANS.



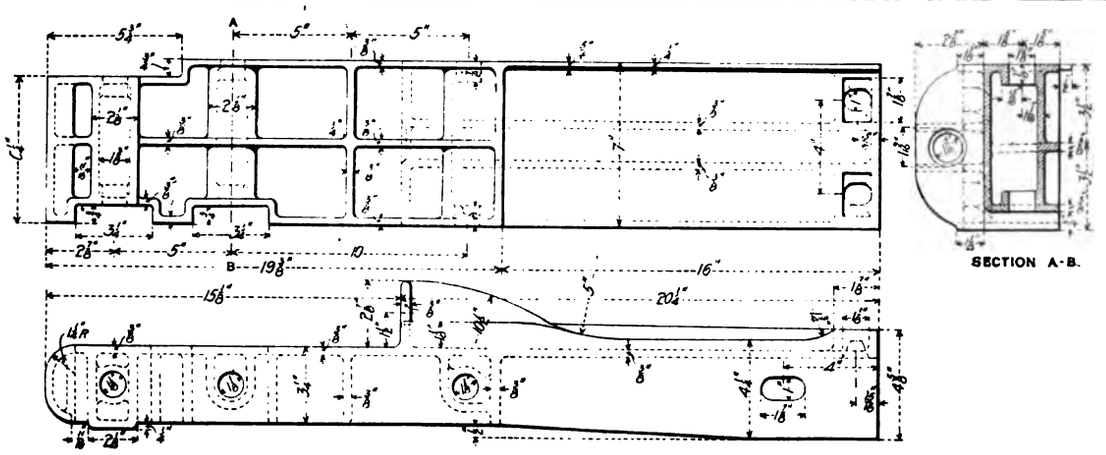
FIGS. 1248-1251. DAYTON TWIN SPRING DRAFT GEAR APPLIED TO STEEL SILLS. DAYTON MALLEABLE IRON CO.



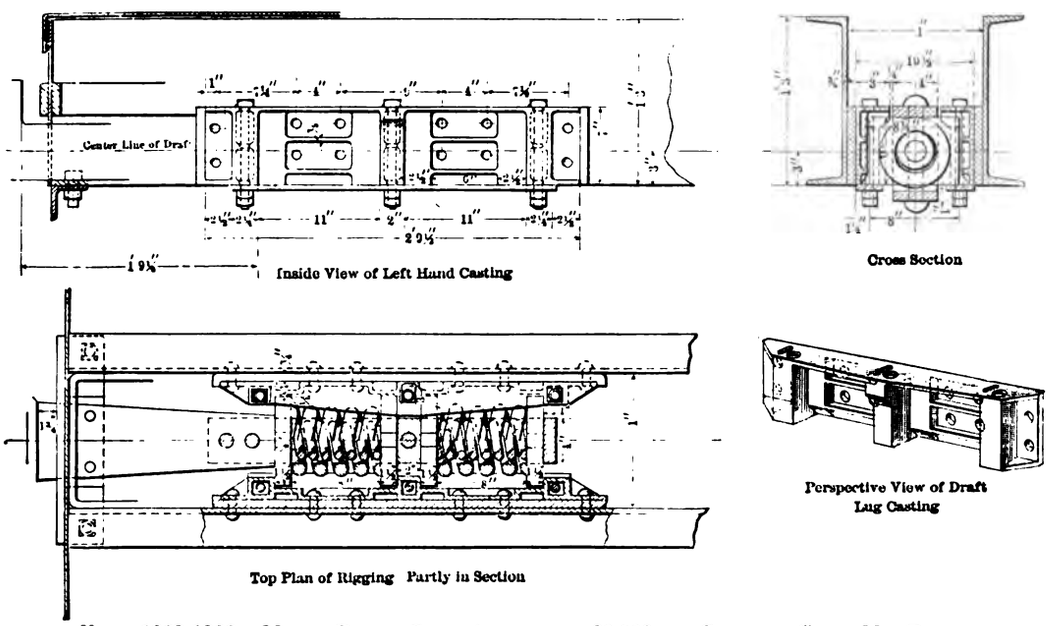
FIGS. 1252-1254. DAYTON TWIN SPRING DRAFT GEAR APPLIED TO WOODEN SILLS. DAYTON MALLEABLE IRON CO.



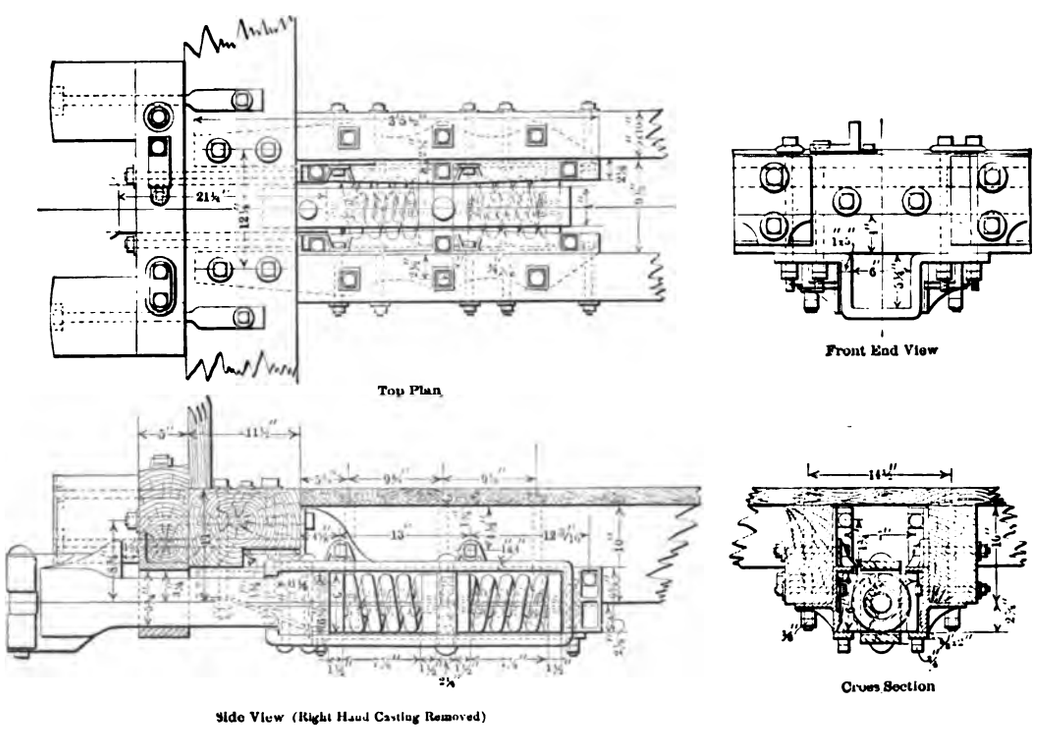
FIGS. 1255-1259. DAYTON SINGLE SPRING DRAFT GEAR. DAYTON MALLEABLE IRON CO.



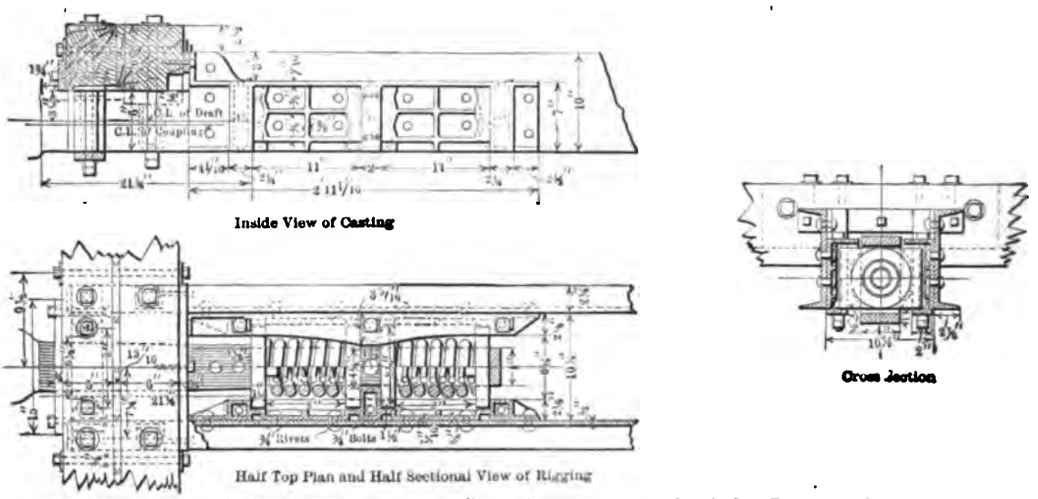
FIGS. 1260-1262. GOULD MALLEABLE IRON DRAFT SILL. GOULD COUPLER CO.


Center Line of Draft
Inside View of Left Hand Casting
Cross Section
Top Plan of Rigging Partly in Section
Perspective View of Draft Lug Casting

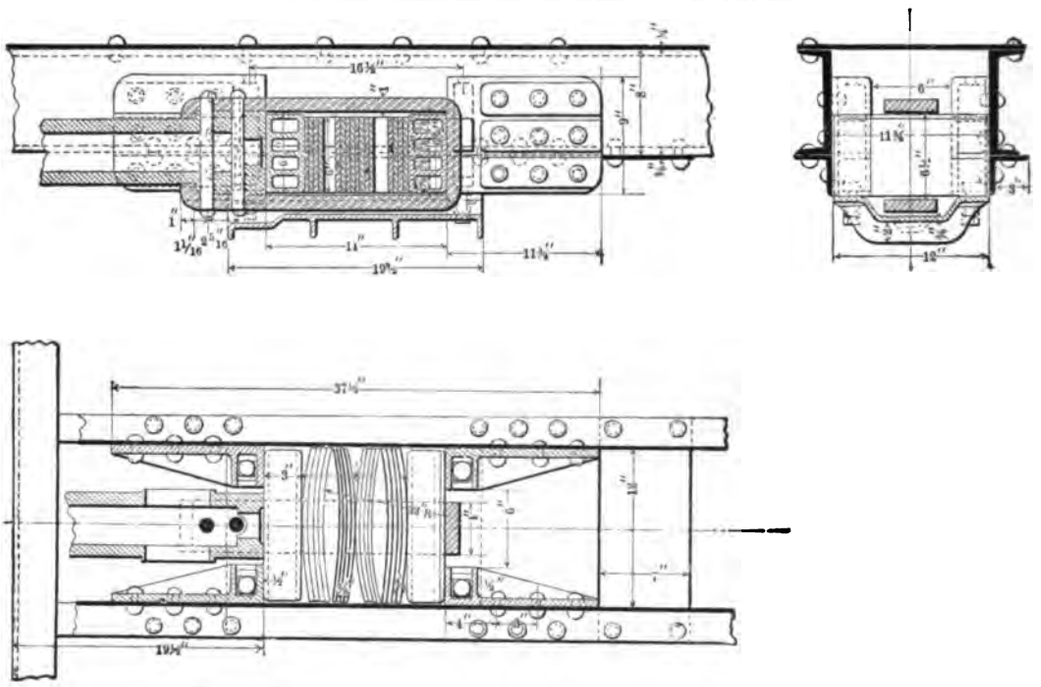
FIGS. 1263-1266. MINER DRAFT GEAR APPLIED TO 80,000 LB. GONDOLA CAR. MO. PAC. STEEL CHANNEL CENTER SILLS. W. H. MINER.



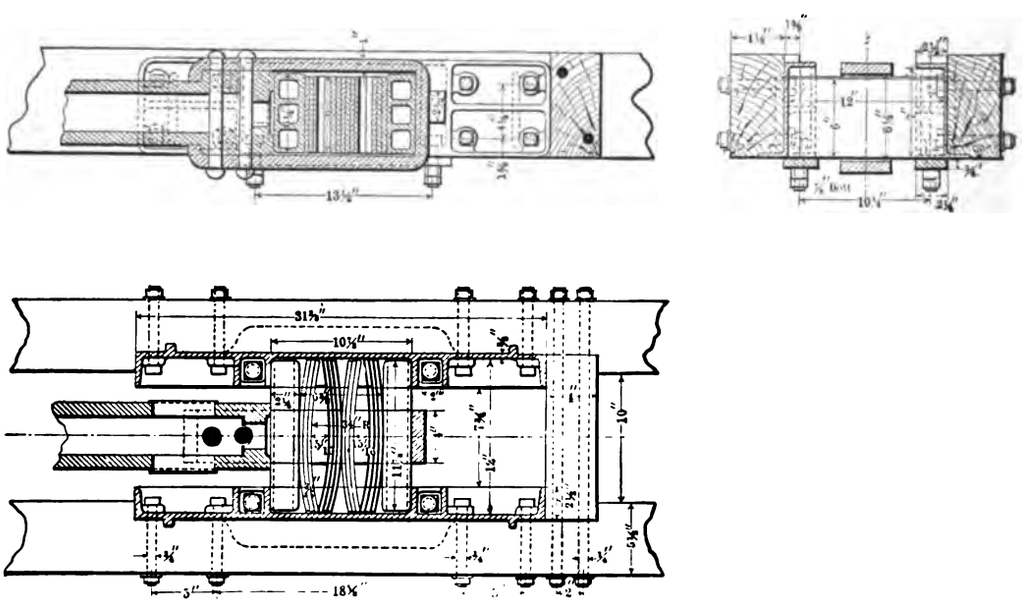
FIGS. 1267-1270. MINER DRAFT GEAR APPLIED TO 80,000 LB. COAL CAR. M., K. & T., W. H. MINER.



FIGS. 1271-1273. MINER DRAFT GEAR APPLIED TO C., M. & ST. P. BOX CAR WITH STEEL CHANNEL CENTER SILLS. W. H. MINER.

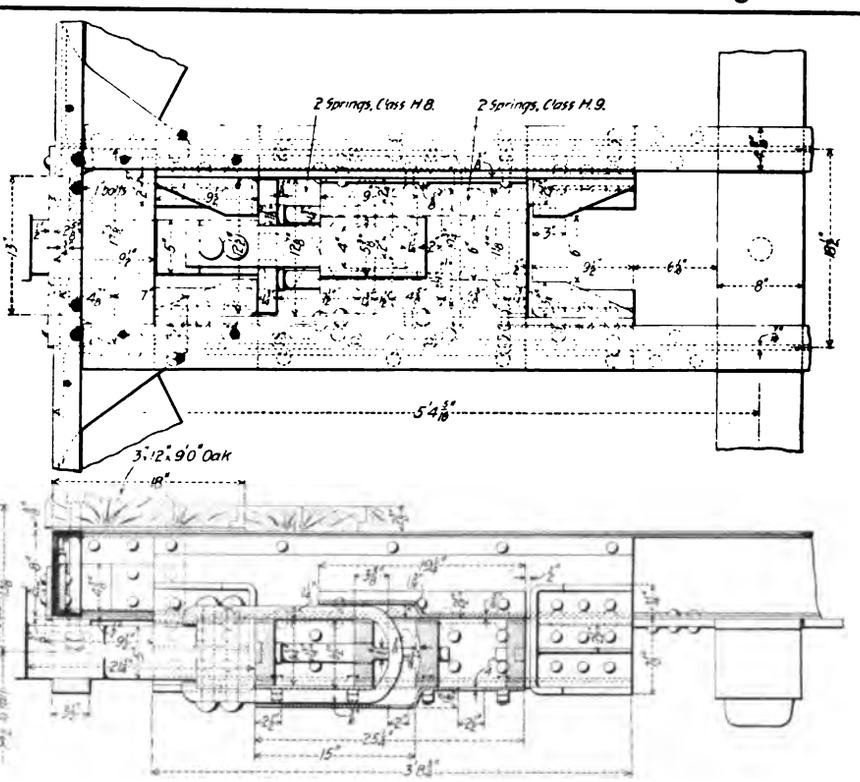


FIGS. 1274-1276. "O AND C" DRAFT GEAR APPLIED TO STEEL CARS. STERLINGWORTH RAILWAY SUPPLY CO.

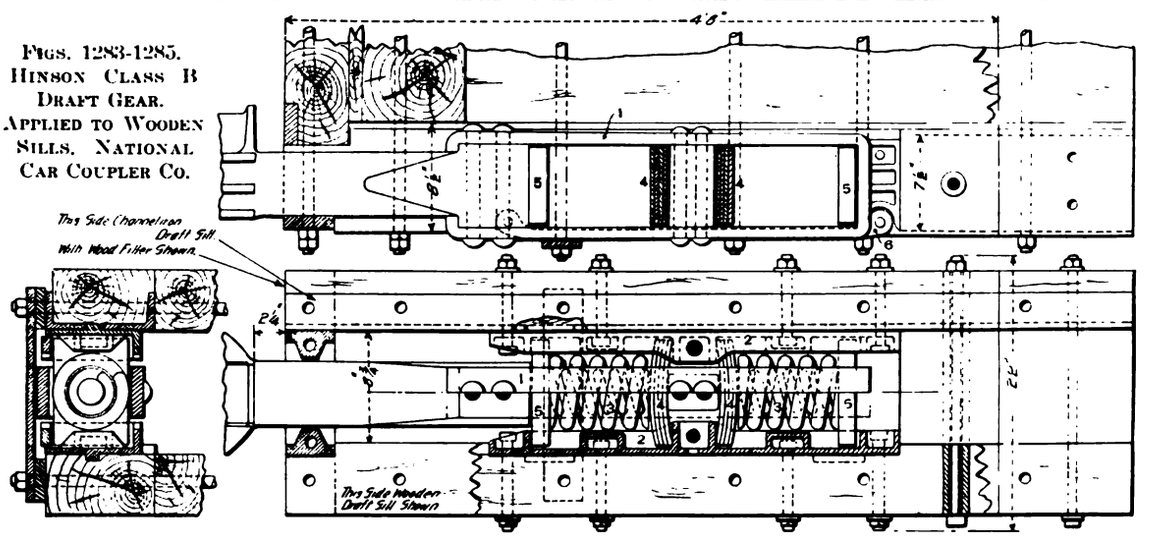


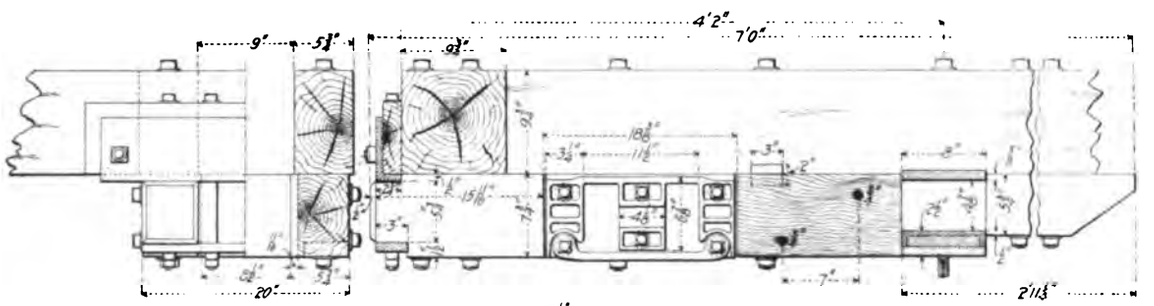
FIGS. 1277-1279. "O AND C" DRAFT RIGGING APPLIED TO WOODEN SILLS. STERLINGWORTH RAILWAY SUPPLY CO.

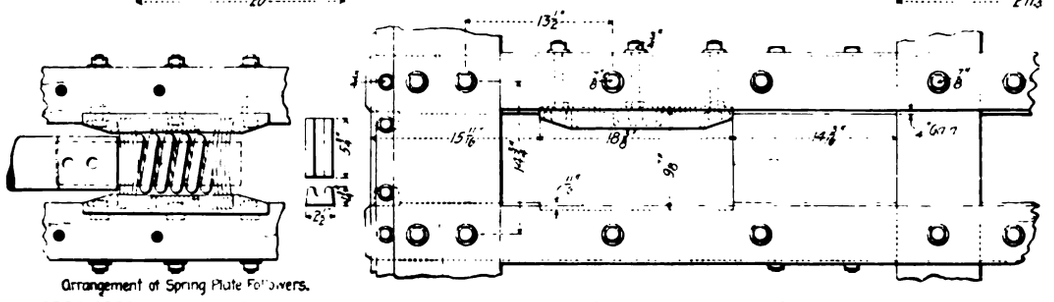
FIGS. 1280-1282. DRAFT GEAR FOR FLAT CAR, 100,000 LBS. CAPACITY. C. & A.



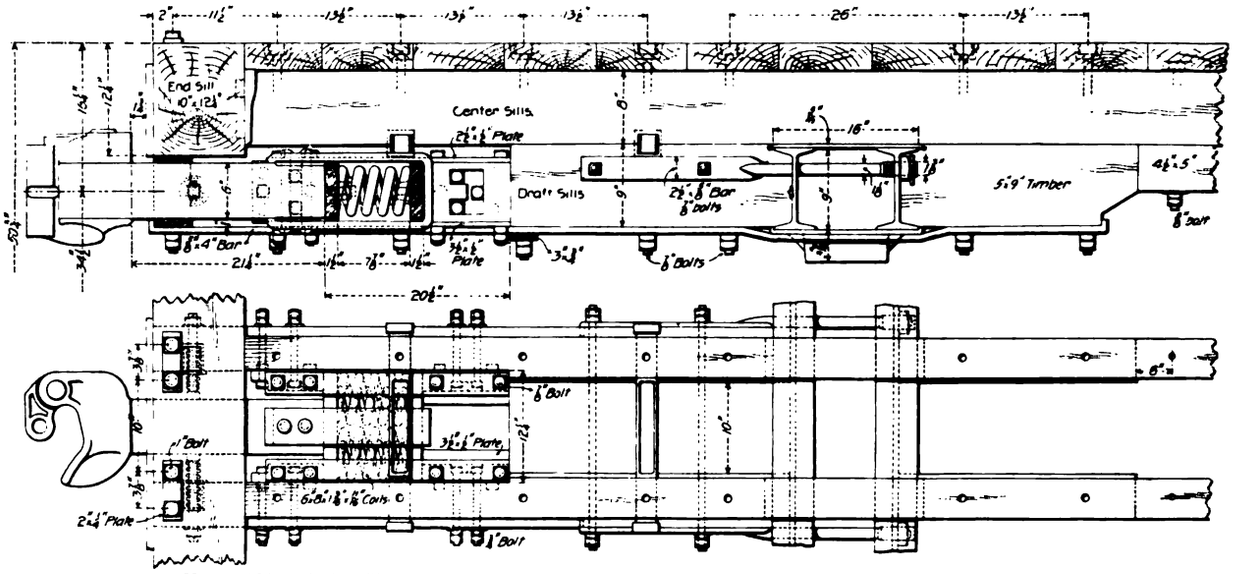
FIGS. 1283-1285. HINSON CLASS B DRAFT GEAR. APPLIED TO WOODEN SILLS. NATIONAL CAR COUPLER CO.



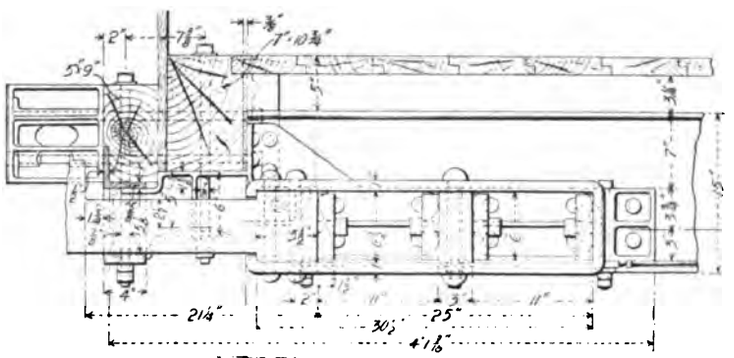




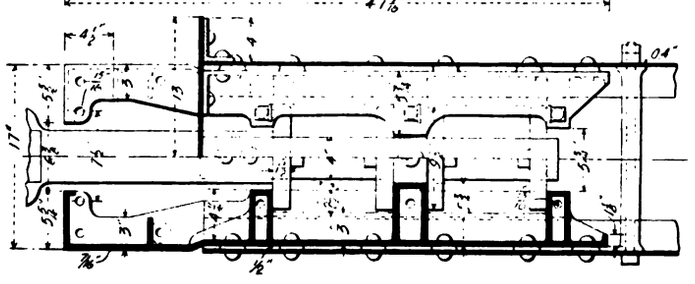
FIGS. 1286-1289. DRAFT GEAR FOR ORE CARS WITH SPRING PLATE FOLLOWERS. DULUTH, MISSABE AND NORTHERN.

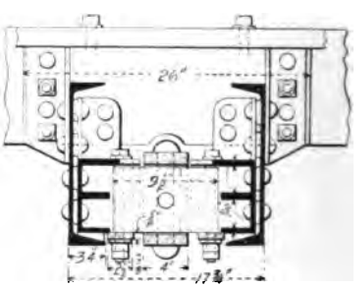


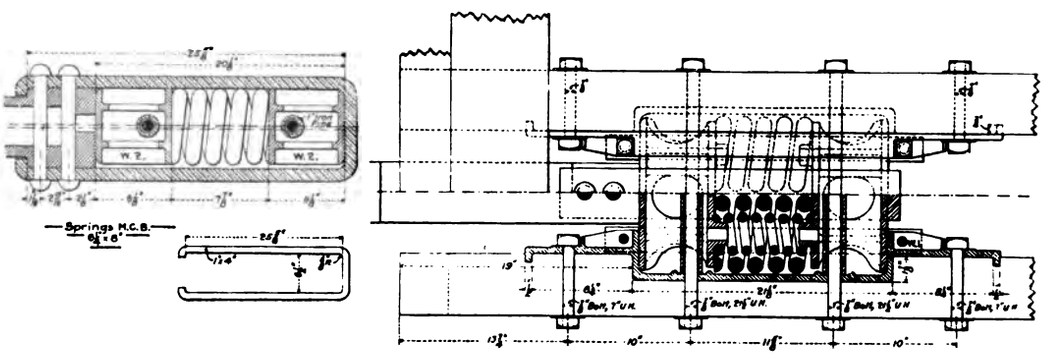
FIGS. 1290-1291. TWIN SPRING DRAFT GEAR. GONDOLA CAR, LAKE TERMINAL R. R.

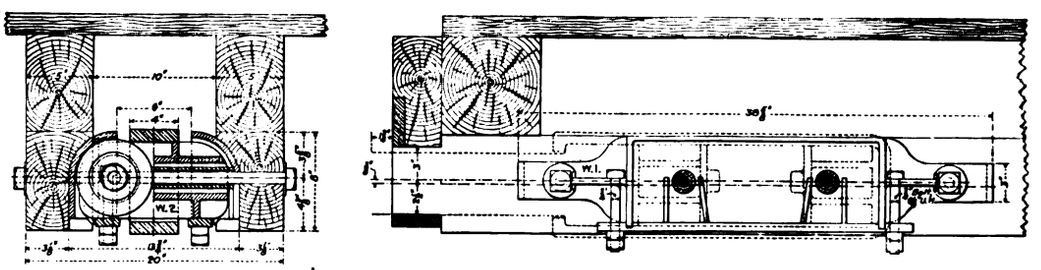


FIGS. 1292-1294.
ATTACHMENTS FOR MINER DRAFT GEAR. 80,000 LBS. CAPACITY BOX CAR WITH STEEL CHANNEL CENTER SILLS. A., T. & S. F.

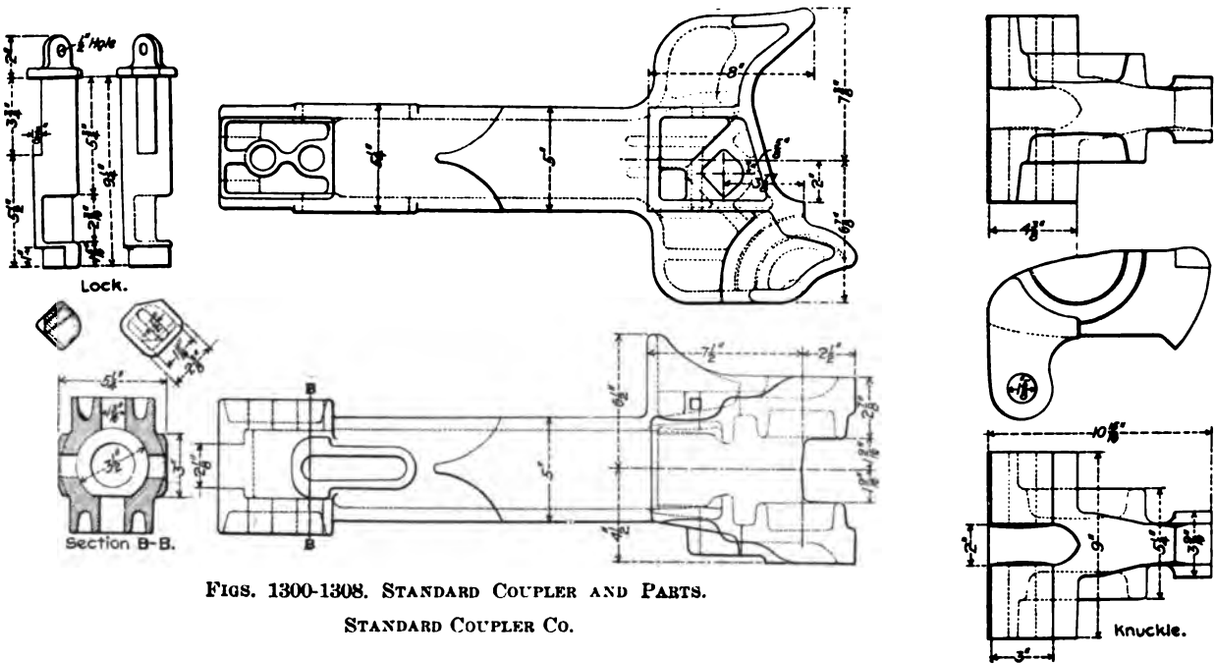




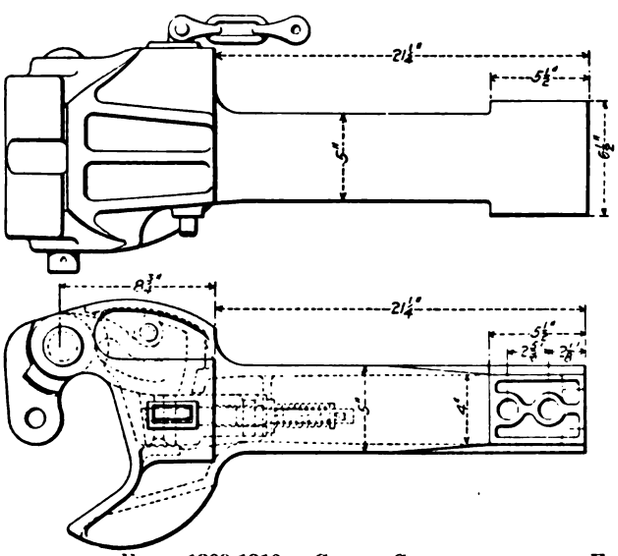




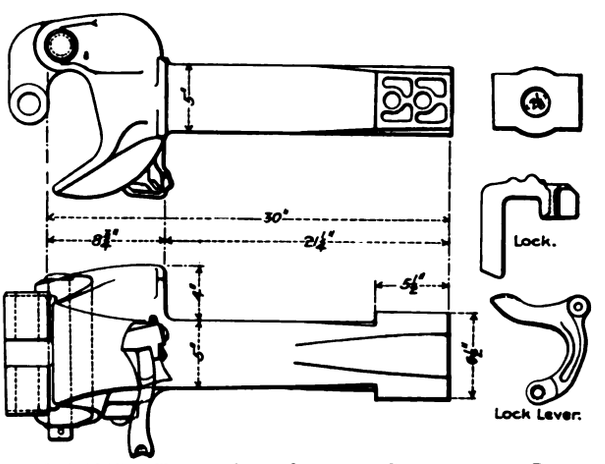
FIGS. 1295-1299. STREET TWIN SPRING DRAFT GEAR. WELLMAN-SEAVER-MORGAN ENGINEERING CO.



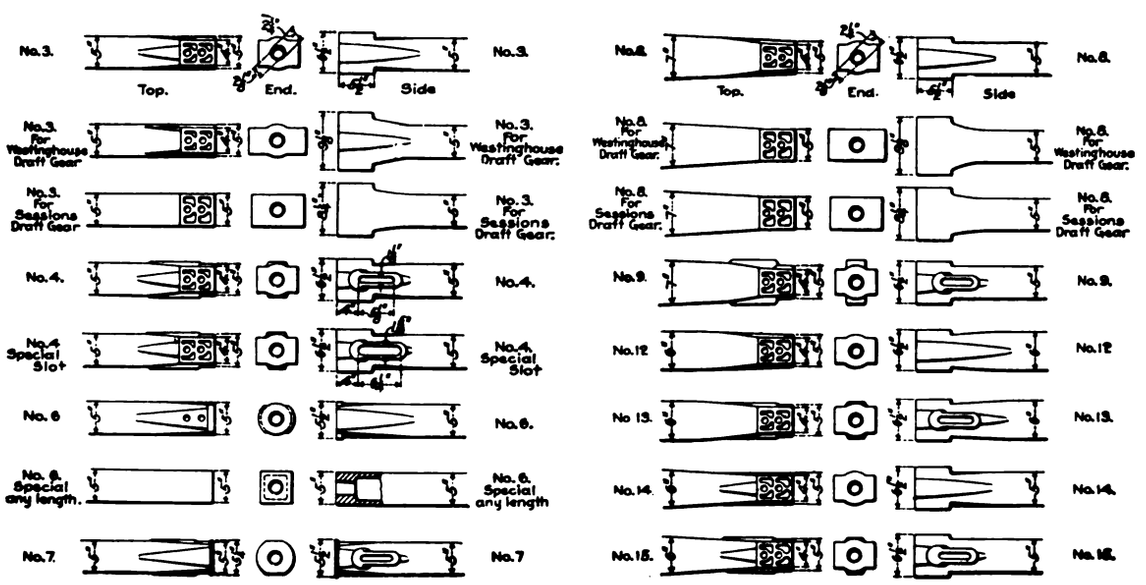
FIGS. 1300-1308. STANDARD COUPLER AND PARTS.
STANDARD COUPLER CO.



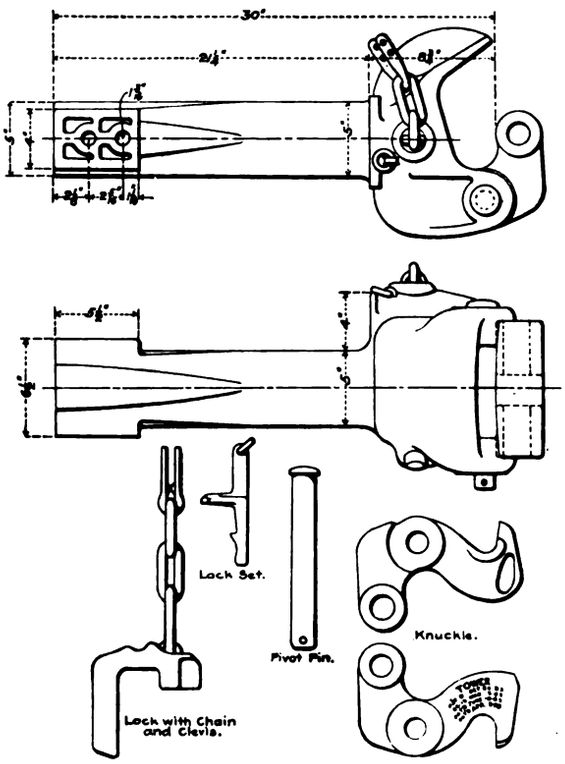
FIGS. 1309-1310. GOULD COUPLER.
GOULD COUPLER CO.



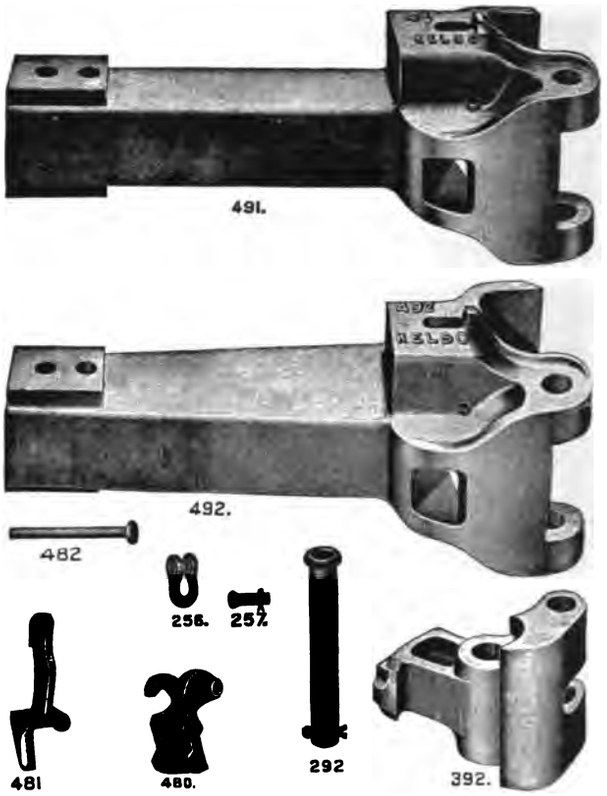
FIGS. 1311-1315. TOWER SIDE OPENING COUPLER AND PARTS.
NATIONAL MALLEABLE CASTINGS CO.



 FIGS. 1316-1363. STYLES OF SHANKS OF TOWER COUPLERS. NATIONAL MALLEABLE CASTINGS CO.



FIGS. 1364-1370. TOWER COUPLER AND PARTS.
NATIONAL MALLEABLE CASTINGS CO.

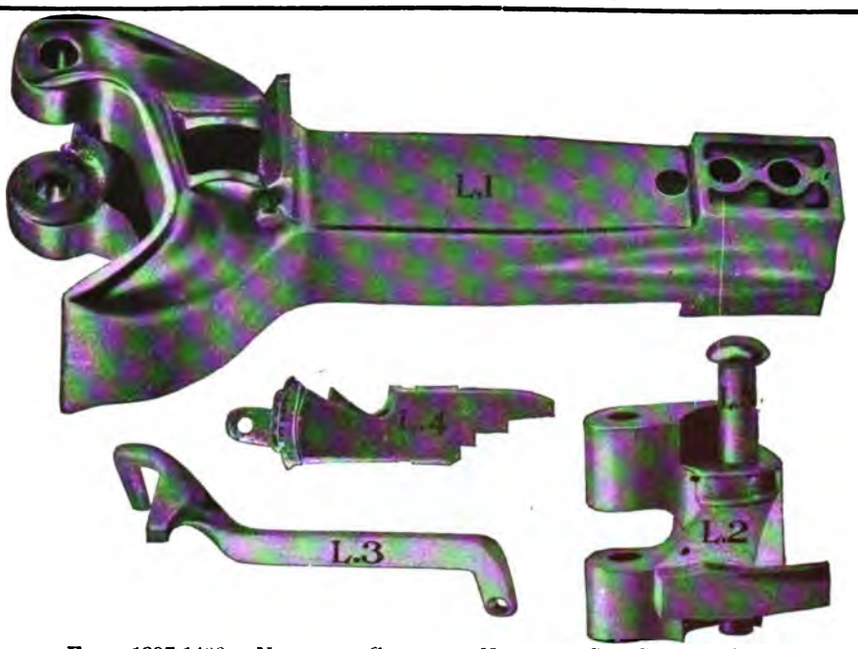


FIGS. 1371-1379. KELSO COUPLER AND PARTS.
5 IN. x 5 IN. AND 5 IN. x 7 IN. SHANKS.
MCCONWAY & TORLEY CO.

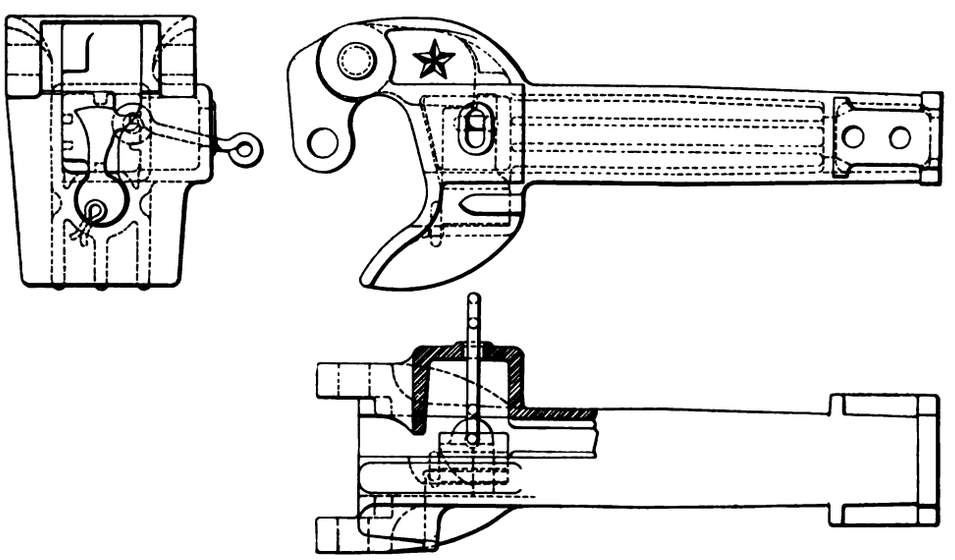
FIGS. 1380-1391. JANNEY COUPLER AND PARTS. MCCONWAY & TORLEY CO.

FIG. 1396. GILMAN BROWN EMERGENCY KNUCKLE
RAILWAY APPLIANCES CO., MAKERS.

FIGS. 1392-1395. CALIFORNIA COUPLER AND PARTS.
F. L. WELLS, GENERAL AGENT.



FIGS. 1397-1400. NATIONAL COUPLER. NATIONAL CAR COUPLER COMPANY.



FIGS. 1401-1403. LONE STAR COUPLER. AMERICAN STEEL FOUNDRIES.

NAMES OF PARTS. FIGS. 1371-1379.

256. *Clevis*
257. *Clevis Pin*
292. *Knuckle Pin*
392. *Knuckle*
480. *Locking Block*
481. *Locking Block Lifter*
482. *Locking Block Pin*
491. *Coupler Casting 5x5 in Shank*
492. *Coupler Casting 5x7 in Shank*

FIG. 1404. KNUCKLE.

NAMES OF PARTS. FIGS. 1380-1391.

2A. *Knuckle, Forged*
86. *Coupler Casting 5x5 in Shank*
88. *Knuckle Pin*
90. *Clevis*
91. *Clevis Pin*
96. *Locking Pin*
115. *Split Key*
243A. *Trigger for Locking Pin*
351S. *Coupler Casting Extra Heavy*
354. *Locking Pin*
429. *Knuckle Pin*
448. *Knuckle*

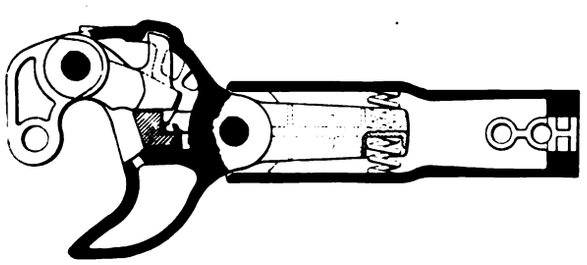


FIG. 1405. FLEXIBLE HEAD COUPLER.

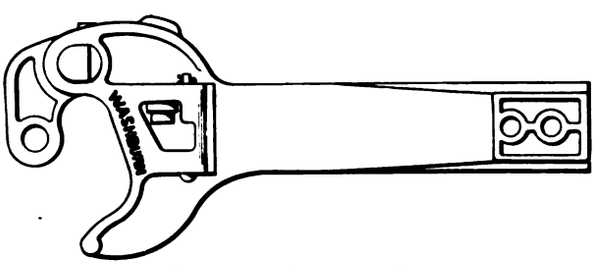
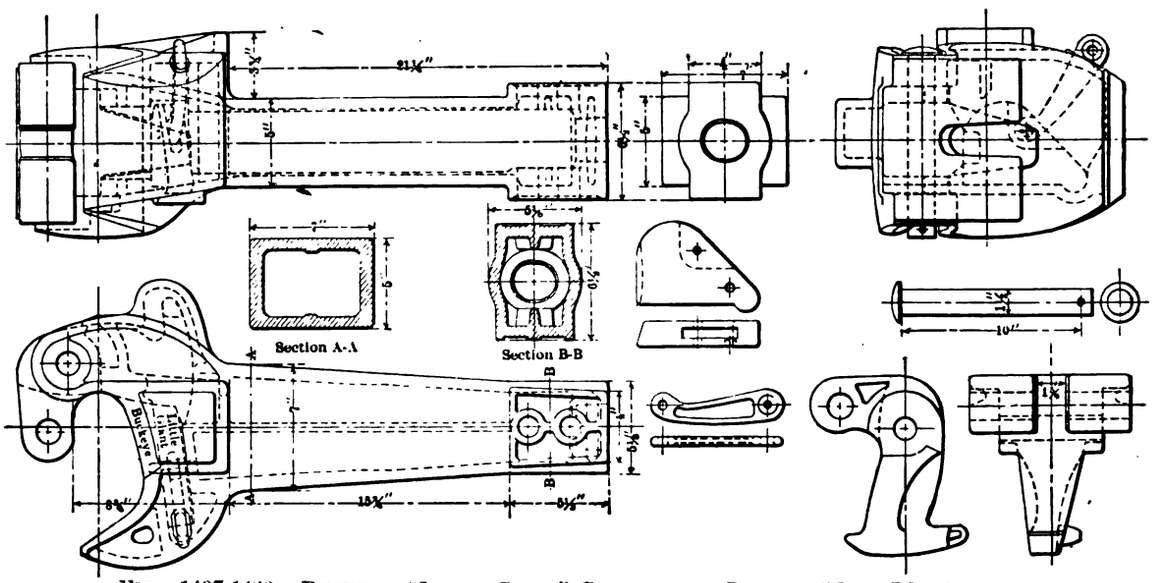
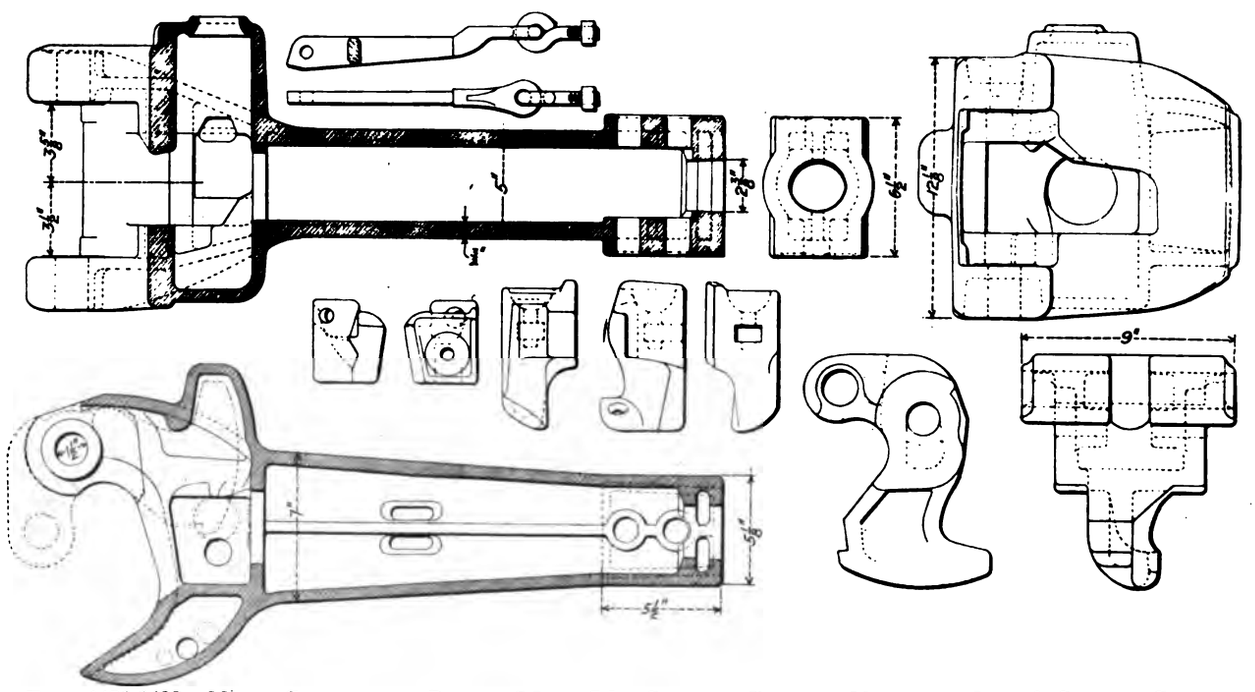


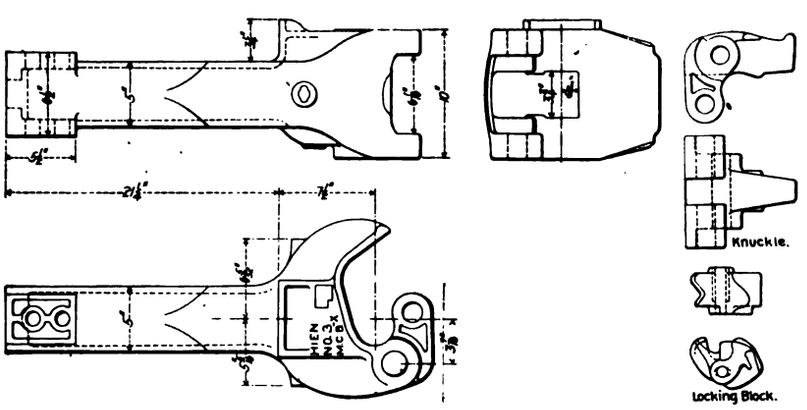
FIG. 1406. STANDARD TYPE.



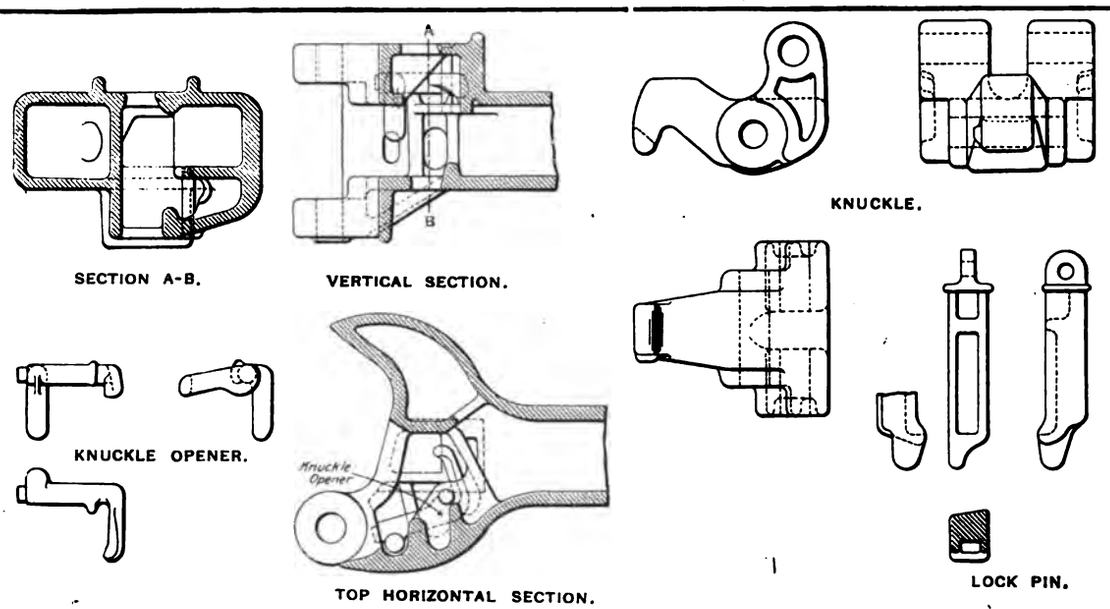
FIGS. 1407-1420. BUCKEYE, "LITTLE GIANT" COUPLER AND PARTS. 5 IN. x 7 IN. SHANK.
BUCKEYE MALLEABLE IRON & COUPLER CO.



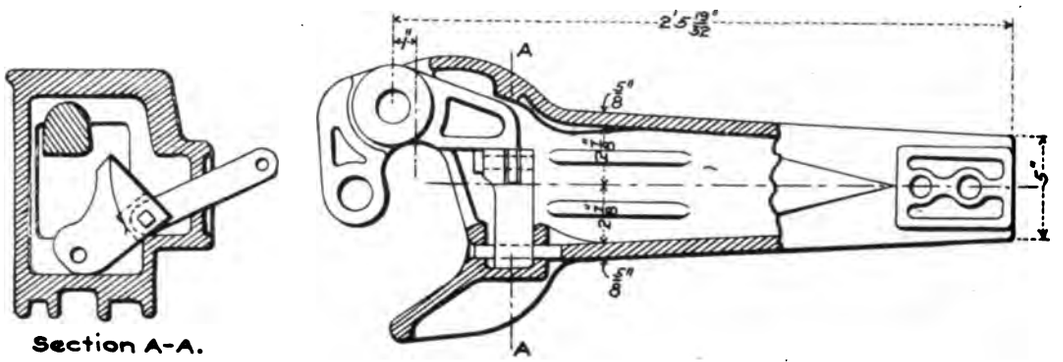
FIGS. 1421-1433. MAJOR COUPLER AND PARTS. 5 IN. x 7 IN. SHANK. BUCKEYE MALLEABLE IRON & COUPLER CO.

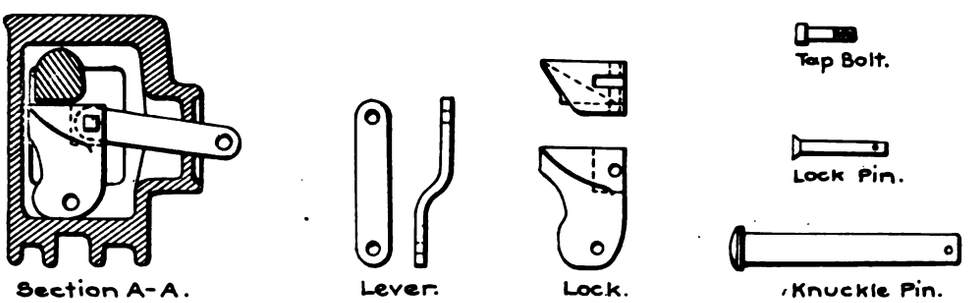


FIGS. 1434-1440. HIEN COUPLER AND PARTS. RAILROAD SUPPLY CO.

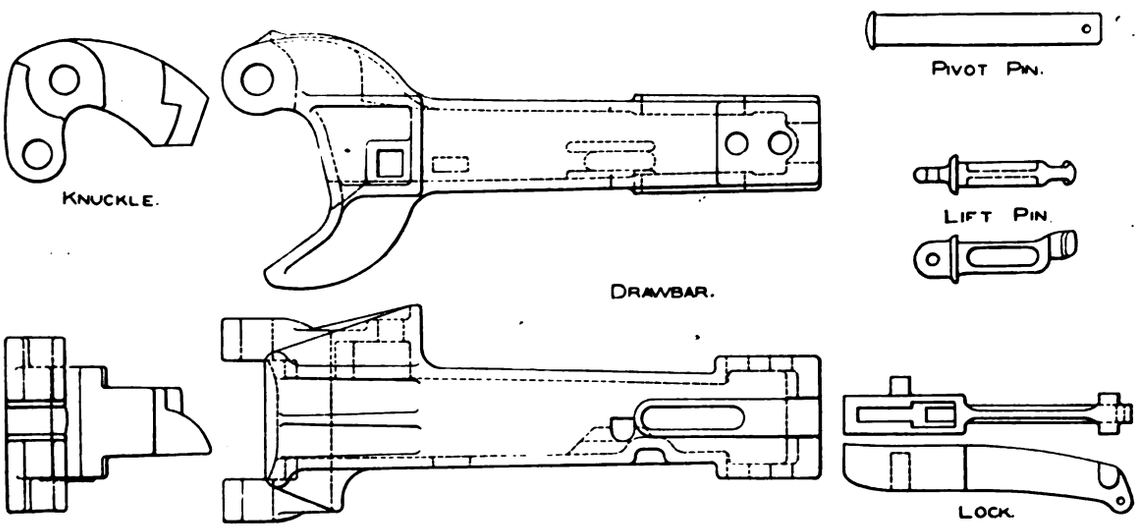


FIGS. 1441-1453. MONARCH COUPLER AND PARTS. MONARCH COUPLER CO.

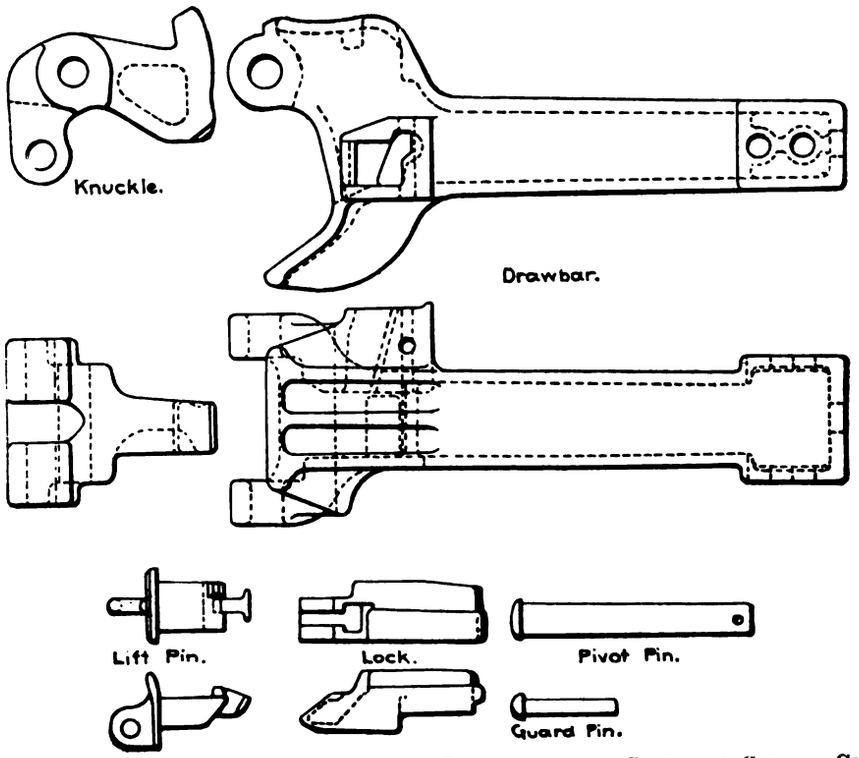




FIGS. 1454-1463. AMERICAN COUPLER AND PARTS. 5 IN. x 7 IN. SHANK. AMERICAN STEEL FOUNDRIES.



FIGS. 1464-1472. CHICAGO COUPLER. LATROBE STEEL & COUPLER CO.



FIGS. 1473-1482. MUNTON COUPLER AND PARTS. LATROBE STEEL AND COUPLER CO.

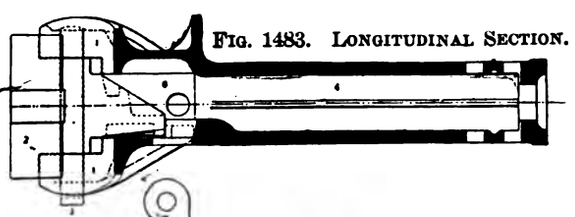


FIG. 1483. LONGITUDINAL SECTION.

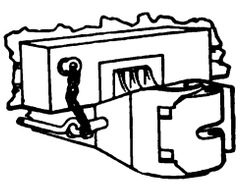


FIG. 1487. PERSPECTIVE VIEW OF COUPLER AND HAND ROD.

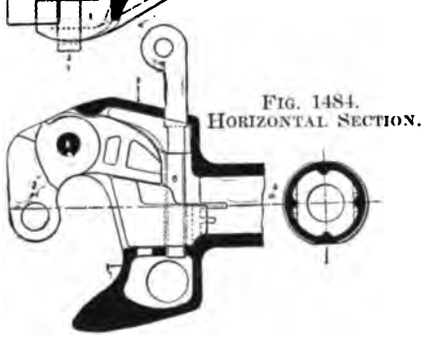


FIG. 1484. HORIZONTAL SECTION.

FIG. 1485. CROSS SECTION.

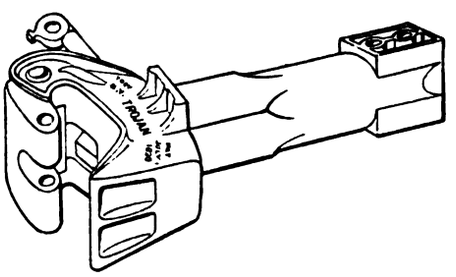


FIG. 1486. PERSPECTIVE VIEW.

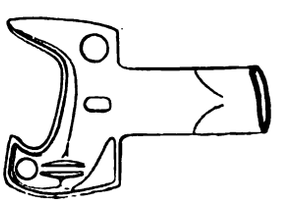


FIG. 1488. BOTTOM PLAN OF HEAD.

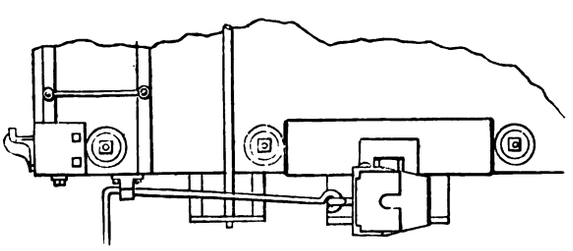


FIG. 1489. COUPLER, HAND ROD AND BRACKET.

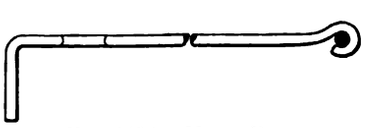


FIG. 1490. HAND ROD.

FIG. 1491. BRACKET FOR FACE OF END SILL.

FIG. 1492. BRACKET FOR CORNER OF SILL.

FIG. 1493. KNUCKLE.

FIG. 1494. KNUCKLE LOCK.

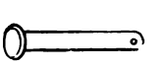


FIG. 1495. KNUCKLE PIN.

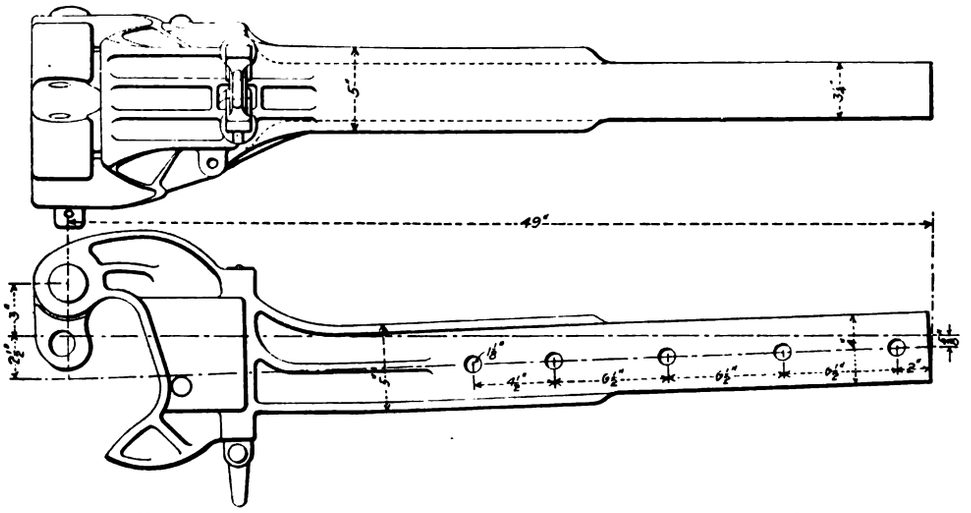
FIG. 1496. OPERATING ROD.

FIG. 1497. FINGER.

FIG. 1498. BRACKET FOR FACE OF SILL.

FIG. 1499. BRACKET FOR UNDER-SIDE OF SILL.

THE TROJAN COUPLER AND PARTS. TROJAN COUPLER CO.



FIGS. 1500-1501. GOULD PASSENGER COUPLER. GOULD COUPLER CO.

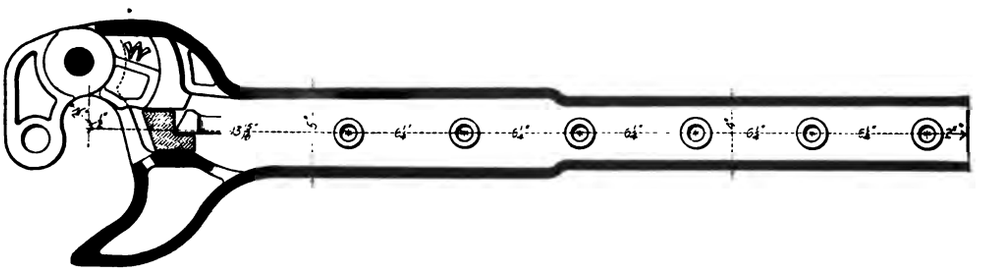
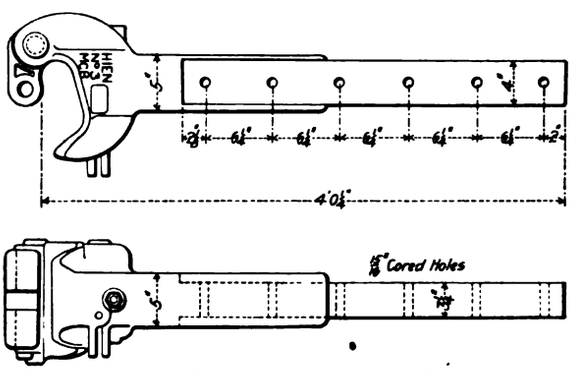
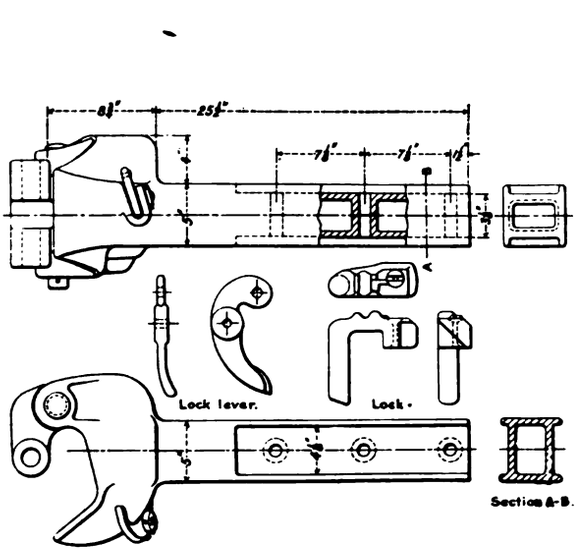


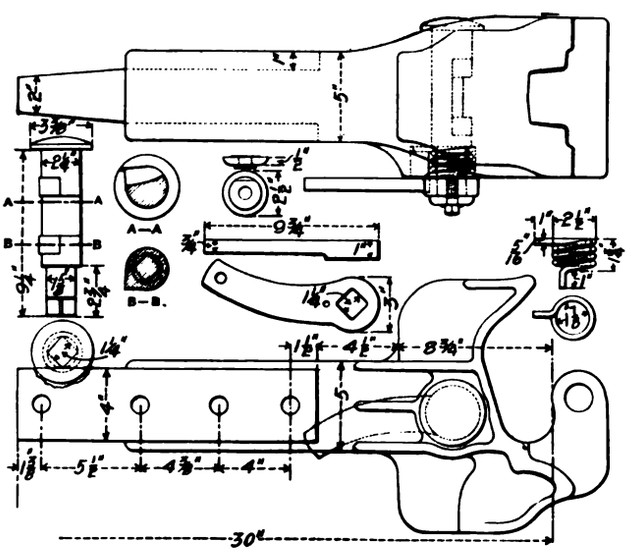
FIG. 1502. WASHBURN PASSENGER COUPLER. WASHBURN COUPLER CO.



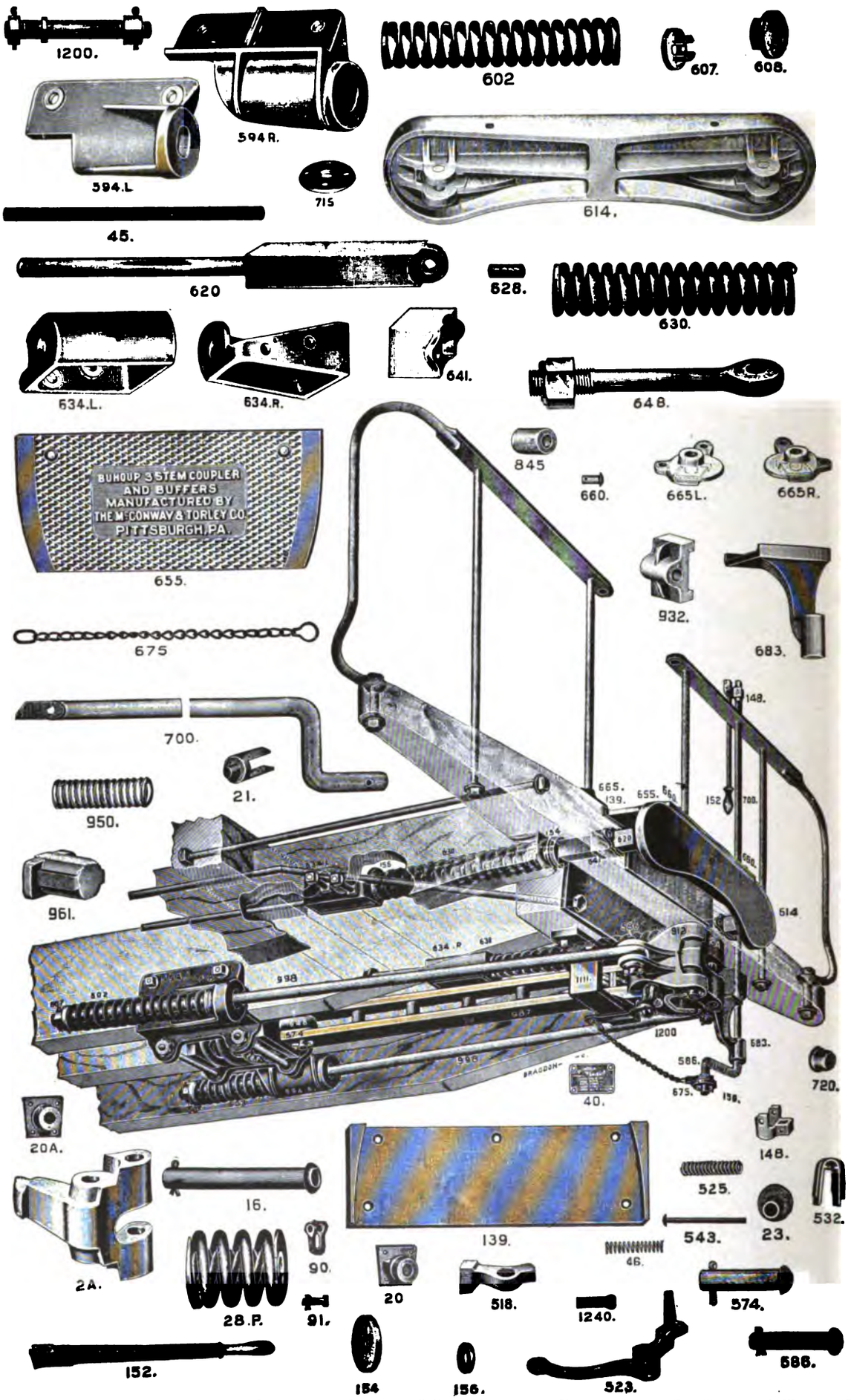
FIGS. 1503-1504. HIEN PASSENGER COUPLER. RAILROAD SUPPLY CO.



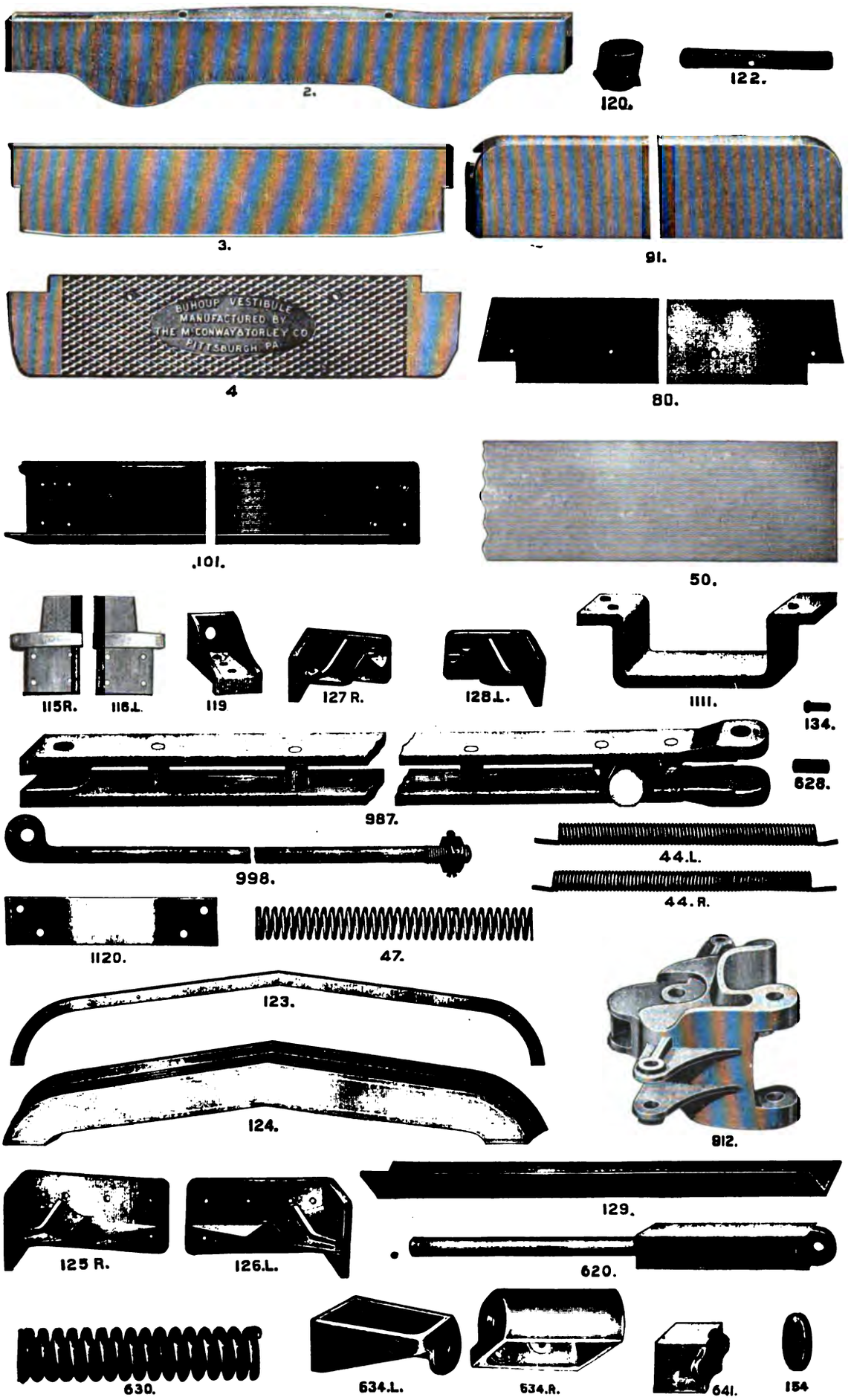
FIGS. 1505-1513. TOWER PASSENGER COUPLER



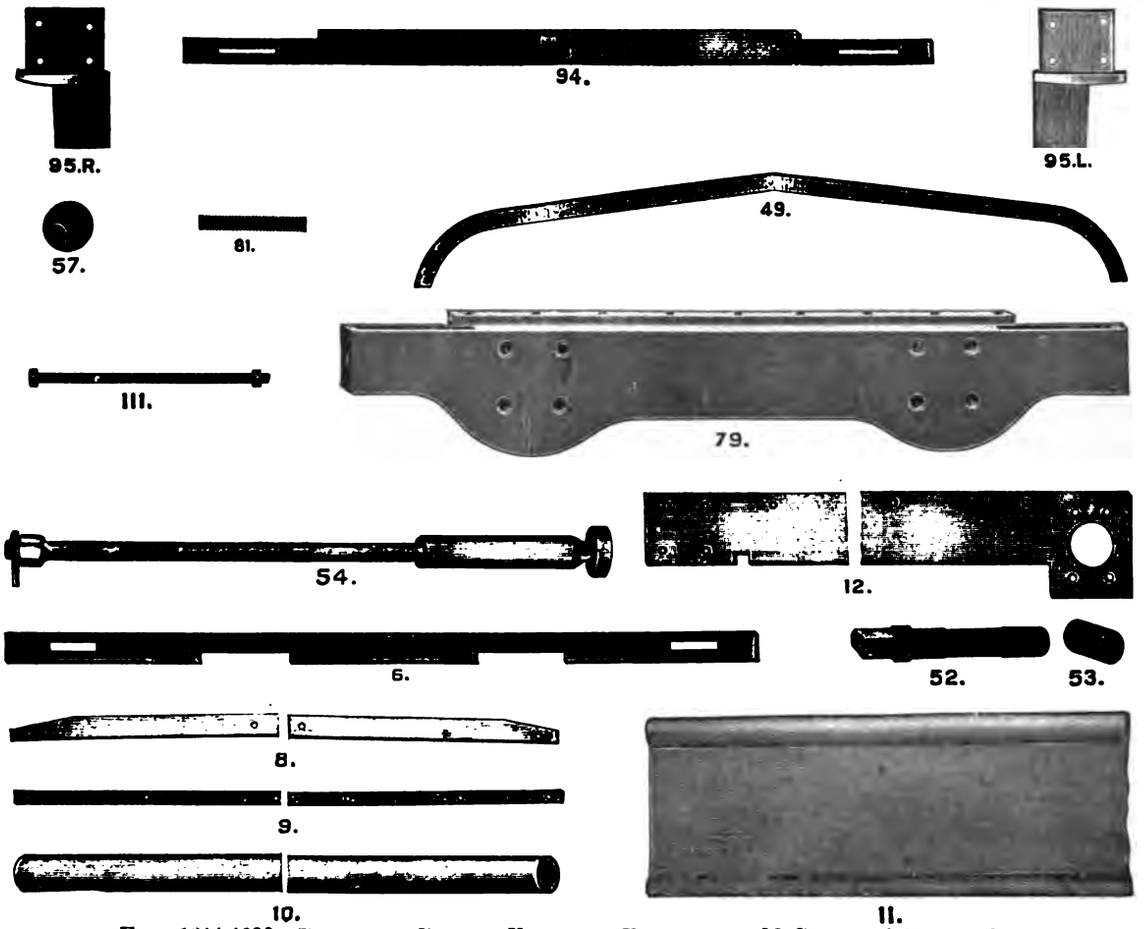
FIGS. 1514-1525. STANDARD PASSENGER COUPLER. STANDARD COUPLER CO.



FIGS. 1526-1578. APPLICATION AND DETAILS OF BUHOUP 3-STEM PLATFORM EQUIPMENT. McCONWAY & TORLEY CO.
FOR NAMES OF PARTS SEE LIST WITH FIGS. 1614-1630. (172)



Figs. 1579-1613. Details of Buhoup 3-Stem Platform Equipment and Vestibule. McConway & Torley Co.
(173) For Names of Parts See List with Figs. 1614-1630.



FIGS. 1614-1630. DETAILS OF BUHOUP VESTIBULE EQUIPMENT. McCONWAY & TORLEY CO.

NAMES OF PARTS OF BUHOUP 3-STEM PLATFORM EQUIPMENT. FIGS. 1526-1613.

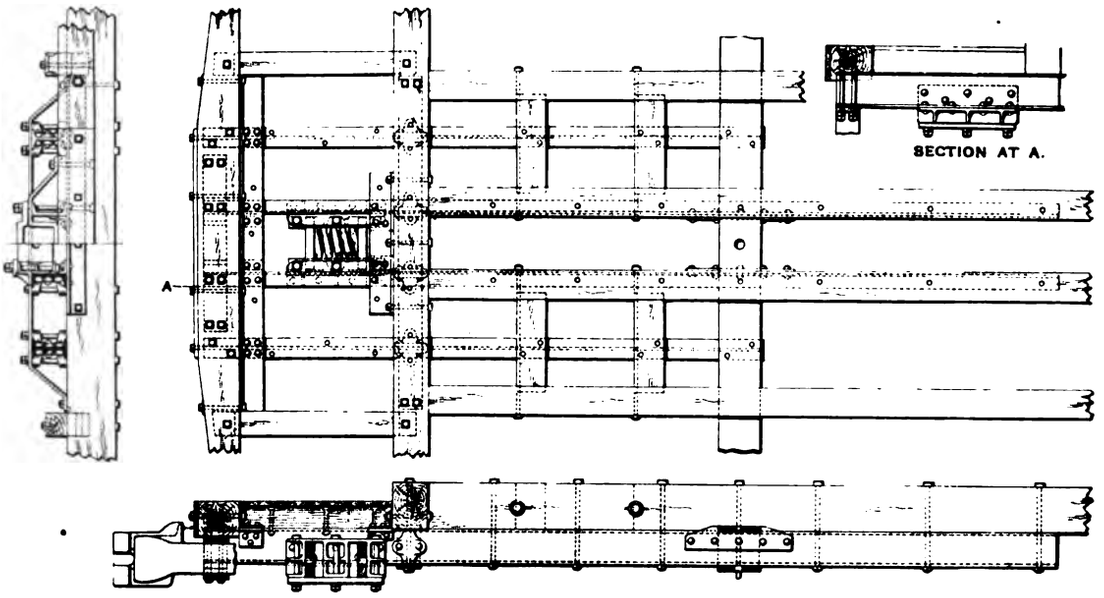
2A. *Knuckle, Forged*
16. *Knuckle Pin*
28P. *Draft Spring*
90. *Clevis*
91. *Clevis Pin*
139. *Foot Plate Housing*
148. *Lever Hinge Bracket*
152. *Lever Handle*
154. *Buffer Stem Ring Washer*
156. *Buffer Stem End Washer*
518. *Catch*
523. *Catch Lever*
525. *Catch Spring*
532. *Catch Spring Pocket*
543. *Catch Spring Pin*
574. *Tail Pin*
586. *Side Stem Pivot Pin*
594. *Side Stem Bracket, R & L*
602. *Side Stem Spring*
607. *Side Stem Lug Washer*
608. *Side Stem Bevel Washer*
614. *Buffer Plate*
620. *Buffer Stem*
628. *Buffer Pin*
630. *Buffer Spring*
634. *Buffer Stem Bracket, R & L*
641. *Buffer Stem Guide*
648. *Draft Bolt*
655. *Foot Plate*
660. *Foot Plate Bolt*
665. *Foot Plate Stop, R & L*
675. *Uncoupling Lever Chain*
683. *Uncoupling Lever Guide*
700. *Uncoupling Lever*
715. *Uncoupling Lever Plate*
720. *Uncoupling Lever Collar*
845. *Center Stem Thimble*
912. *Coupler Head Casting*
932. *Spring Box Holder*
950. *Side Motion Spring*
961. *Spring Box*
987. *Center Stem*
998. *Side Stem*
1111. *Stirrup*
1120. *Chafing Plate*
1200. *Center Stem Pivot Pin*
1210. *Buffer Stem Split Key*

NAMES AND PARTS OF BUHOUP VESTIBULE EQUIPMENT. FIGS. 1526-1630.

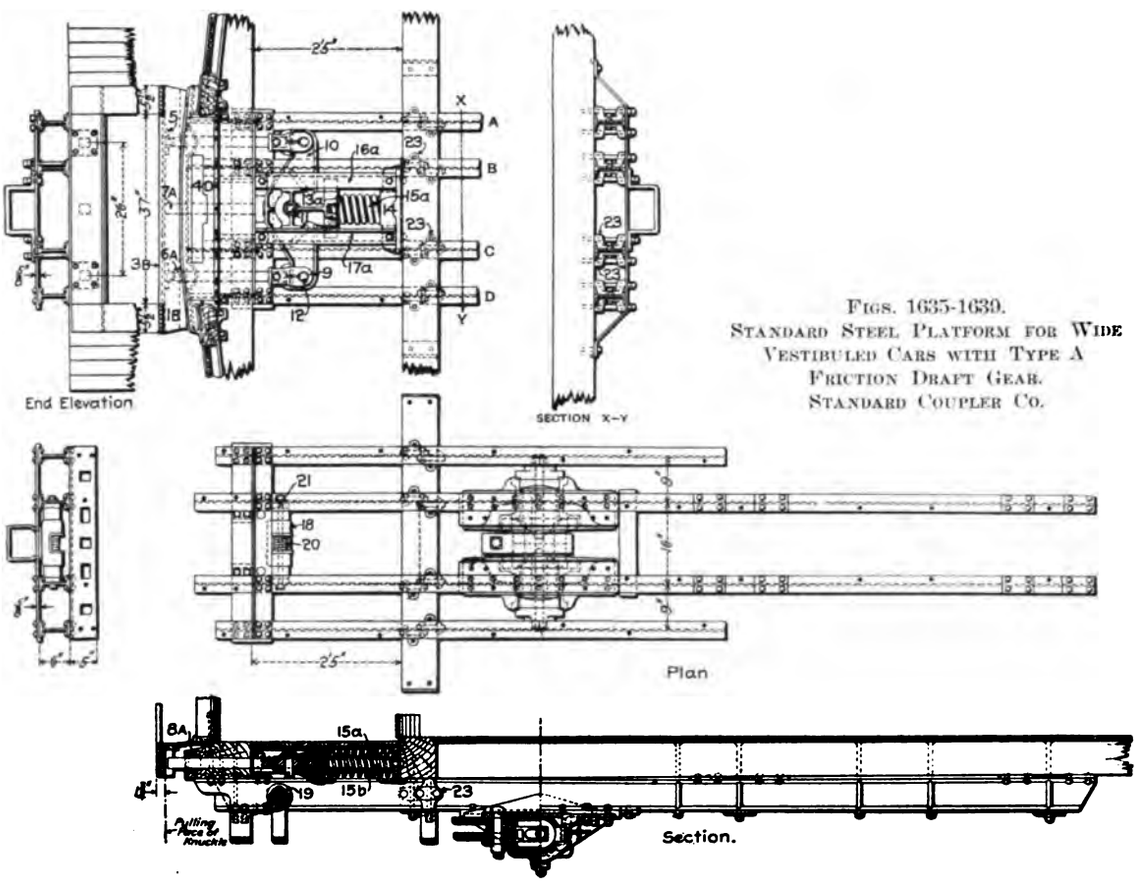
2. *Buffer Plate*
3. *Foot Plate Housing*
4. *Foot Plate*
6. *Spanner Bar, Lower*
8. *Curtain Plate, Front*
9. *Curtain Plate, Rear*
10. *Curtain Roller*
11. *Curtain*
12. *Post Plate, L & R*
20. *Curtain Bearing, Lower*
20A. *Curtain Bearing, Lower (For Steel Platform)*
21. *Curtain Bearing, Upper*
23. *Curtain Socket*
40. *Patent Plate*
44. *Curtain Spring, L & R*
45. *Curtain Roller Plug*
46. *Arch Plate and Buffer Spring*
47. *Piston Stem Spring*
49. *Arch Plate Band*
50. *Shield*
52. *Curtain Spring Plug, large*
53. *Curtain Spring Plug, small*
54. *Piston Stem*
57. *Piston Stem Washer*
79. *Buffer Plate (For Steel Platform)*
80. *Foot Plate (For Steel Platform)*
81. *Buffer Plate Spring (For Steel Platform)*
91. *Arch Plate*
94. *Spanner Bar, Upper*
95. *Angle Connection, Top, R*
96. *Angle Connection, Top, L*
101. *Bulb Angle*
111. *Spanner Bar Bolt*
115. *Angle Connection, Bottom, R*
116. *Angle Connection, Bottom, L*
119. *Piston Stem Bracket*
120. *Piston Stem Guide*
122. *Piston Stem Ferrule*
123. *Accordeon Hood Band*
124. *Accordeon Hood*
125. *Hood Brace Bracket, R*
126. *Hood Brace Bracket, L*
127. *Hood Brace Bracket, R*
128. *Hood Brace Bracket, L*
129. *Hood Brace*
134. *Foot Plate Bolt*
628. *Buffer Pin*

154. *Buffer Stem Ring Washer*
620. *Buffer Stem*
630. *Buffer Spring*
634. *Buffer Stem Bracket, L & R*
641. *Buffer Stem Guide*
1240. *Buffer Stem Split Key*

(Furnished on special order only.)



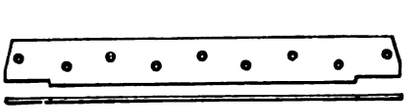
FIGS. 1631-1634. STANDARD STEEL PLATFORM FOR CABOOSE CARS. STANDARD COUPLER CO., MAKERS.



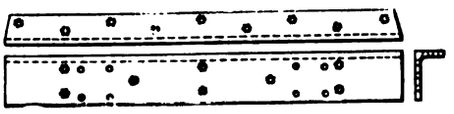
FIGS. 1635-1639.
STANDARD STEEL PLATFORM FOR WIDE VESTIBULED CARS WITH TYPE A FRICTION DRAFT GEAR.
STANDARD COUPLER CO.

NAMES OF PARTS OF FIGS. 1635-1639.

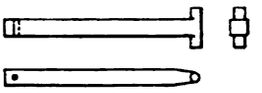
A, B, C, D. *Platform Sill, I Beam*
1b. *Buffer Tread*
2b. *Buffer Face Angle*
3b. *Buffer Face Plate*
4d. *Name Plate*
5. *Buffer Stem Hinge*
6a. *Side Buffer Stem*
7a. *Center Buffer Stem*
8a. *Buffer Stem Sleeve*
9. *Buffer Stem Clevis and Bolt*
10. *Equalizer*
11. *Center Equalizer Pin*
12. *Side Equalizer Pin*
13a. *Front Spring Cup*
14. *Back Spring Cup*
15a. *Buffer Spring*
15b. *Buffer Spring*
16a. *Equalizer Guide Plate*
17a. *Equalizer Guide Angle*
18. *Drawbar Guide*
19. *Drawbar Guide Sleeve*
20. *Drawbar Guide Spring*
21. *Drawbar Guide Rod*
22a. *Eye Bolt Casting*
23. *I Beam Brackets*
24. *Buffer Beam Angle*



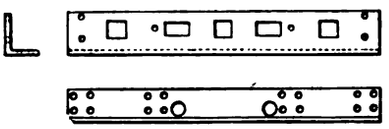
FIGS. 1640-1641.
BUFFER TREAD. 1b.



FIGS. 1642-1644.
BUFFER FACE ANGLE, 2b.

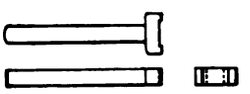


FIGS. 1645-1647.
SIDE BUFFER STEM, 6a.

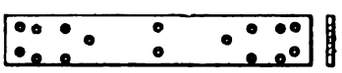


FIGS. 1648-1650.
BUFFER BEAM ANGLE, 24.

FIG. 1651. NAME PLATE, 4d.



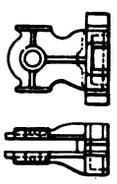
FIGS. 1652-1654.
CENTER BUFFER STEM, 7a.



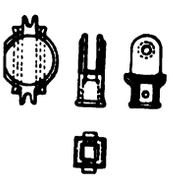
FIGS. 1655-1656.
BUFFER FACE PLATE, 3b.

FIG. 1657.
BUFFER SPRINGS, 15a and 15b.

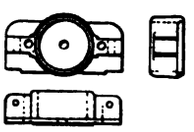
FIG. 1658.



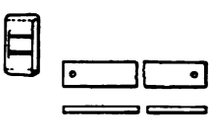
FIGS. 1659-1661.
FRONT SPRING CUP, 13a.



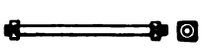
FIGS. 1662-1664.
BUFFER STEM CLEVIS, 9.



FIGS. 1665-1667.
BACK SPRING CUP, 14.



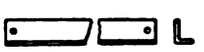
FIGS. 1668-1669.
EQUALIZER GUIDE PLATE, 16a.



FIGS. 1670-1671.
DRAWBAR GUIDE ROD. 21.

FIGS. 1672-1673.
BUFFER STEM SLEEVE. 8a.

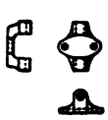
FIGS. 1674-1675.
DRAWBAR GUIDE. 18.



FIGS. 1676-1677.
EQUALIZER GUIDE ANGLE. 17a.

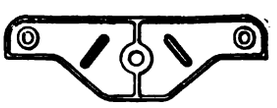
FIG. 1678.
DRAWBAR GUIDE SPRING, 20.

FIGS. 1679-1680.
DRAWBAR GUIDE SLEEVE, 19.



FIGS. 1681-1683.
I BEAM BRACKETS, 23.

FIGS. 1684-1686.
EYE BOLT CASTING, 22a.



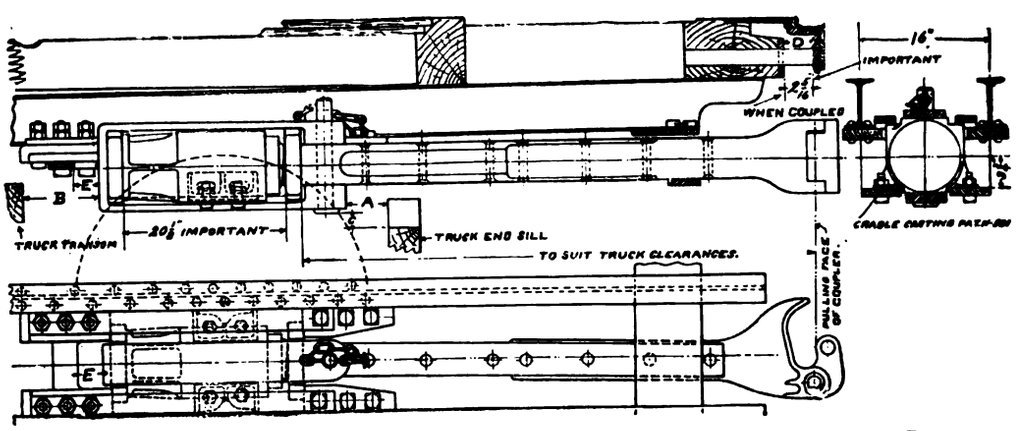
FIGS. 1687-1688.
EQUALIZER, 10.

FIGS. 1689-1690.
SIDE EQUALIZER PIN, 12.

FIGS. 1691-1692.
CENTER EQUALIZER PIN, 11.

FIGS. 1693-1695.
BUFFER STEM HINGE, 5.

DETAILS OF STANDARD STEEL PLATFORM. STANDARD COUPLER CO., MAKERS.



FIGS. 1696-1698. WESTINGHOUSE FRICTION DRAFT GEAR APPLIED TO PASSENGER CAR.
WESTINGHOUSE AIR BRAKE CO., MAKERS.

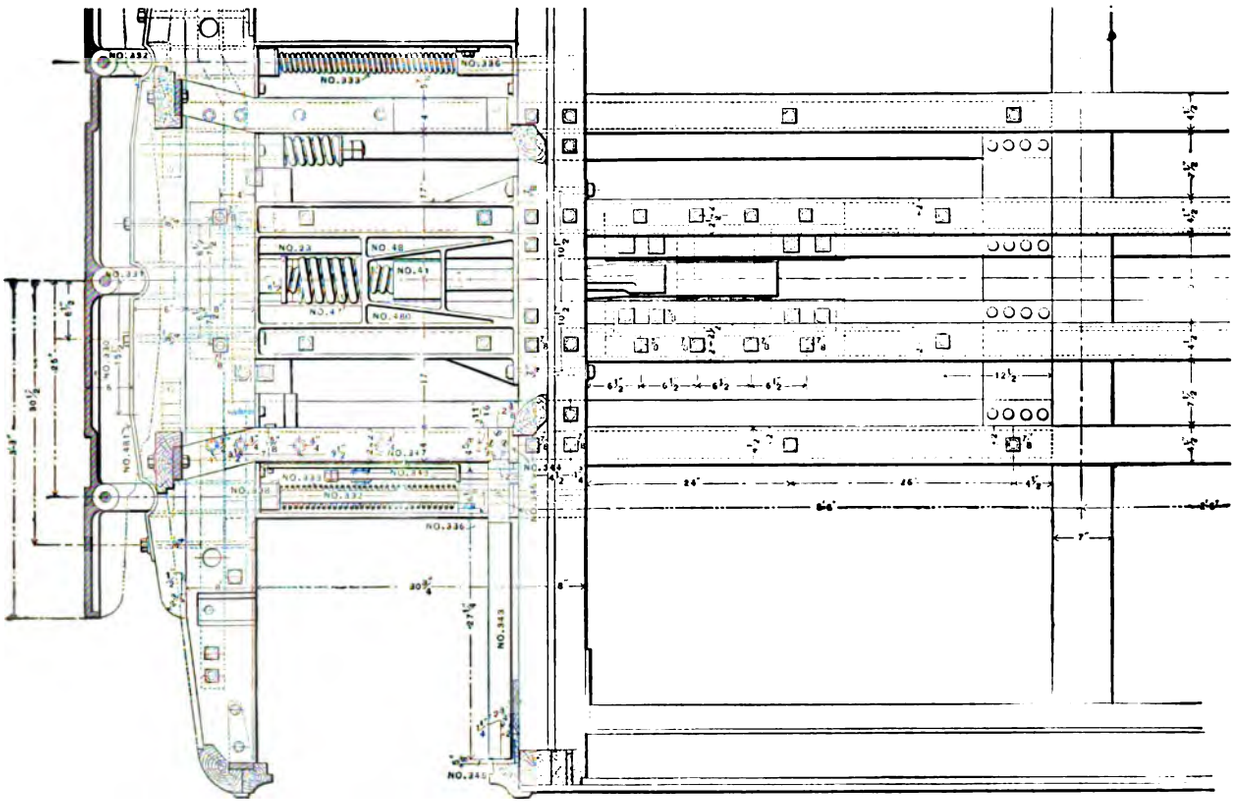
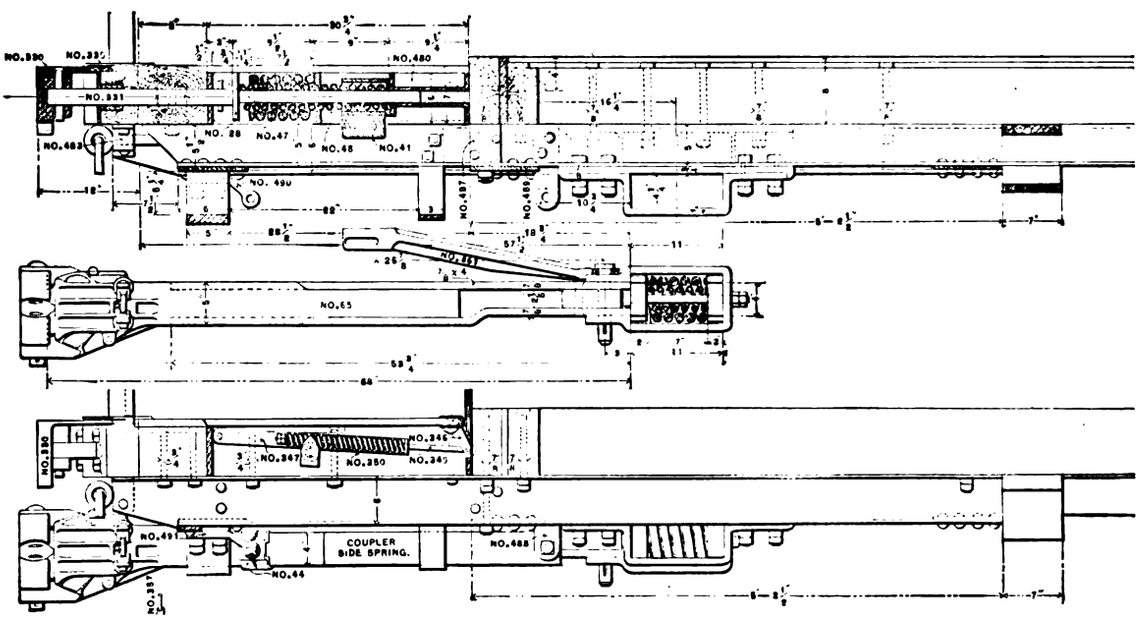
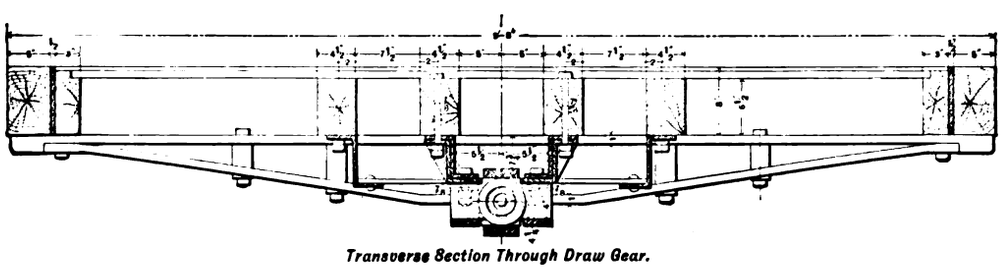


FIG. 1699. PLAN OF GOULD WIDE VESTIBULE PLATFORM AND DRAFT GEAR.



FIGS. 1700-1701. SIDE ELEVATION AND SECTION OF GOULD WIDE VESTIBULE PLATFORM AND DRAFT GEAR.



Transverse Section Through Draw Gear.

FIG. 1702. SECTION OF GOULD WIDE VESTIBULE PLATFORM AND DRAFT GEAR.
GOULD COUPLER CO., MAKERS.

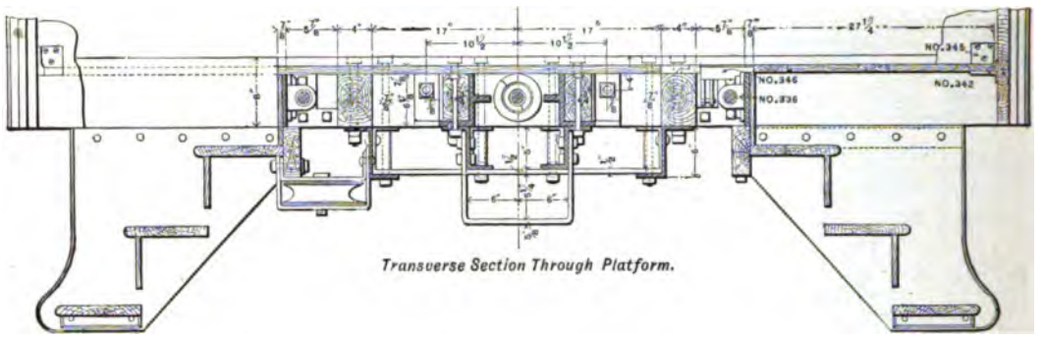


FIG. 1703. SECTION, GOULD WIDE VESTIBULE PLATFORM AND DRAFT GEAR.

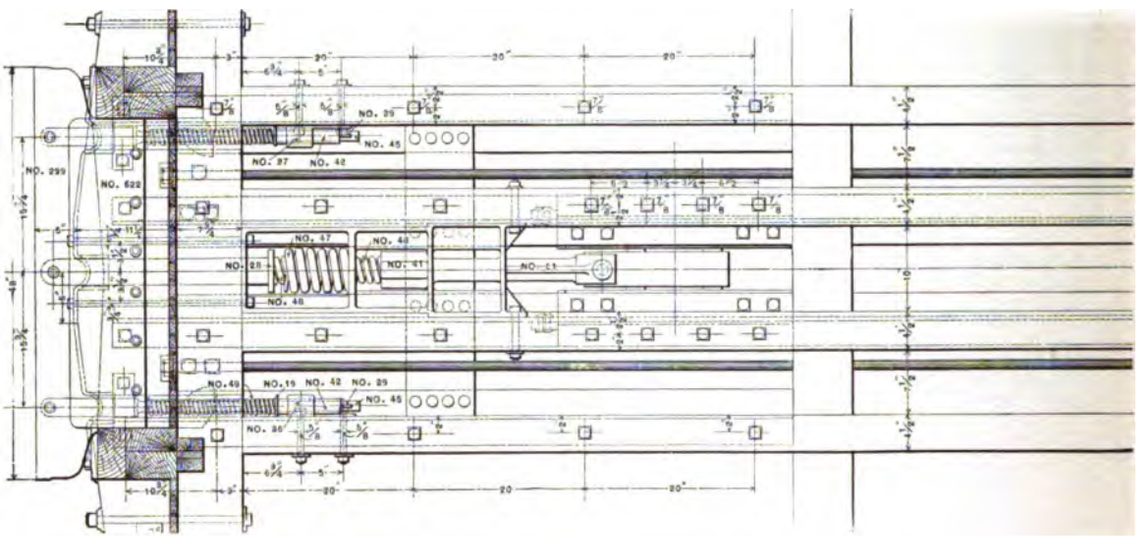


FIG. 1704. PLAN OF GOULD DUMMY VESTIBULE AND DRAFT GEAR FOR BAGGAGE AND EXPRESS CARS.

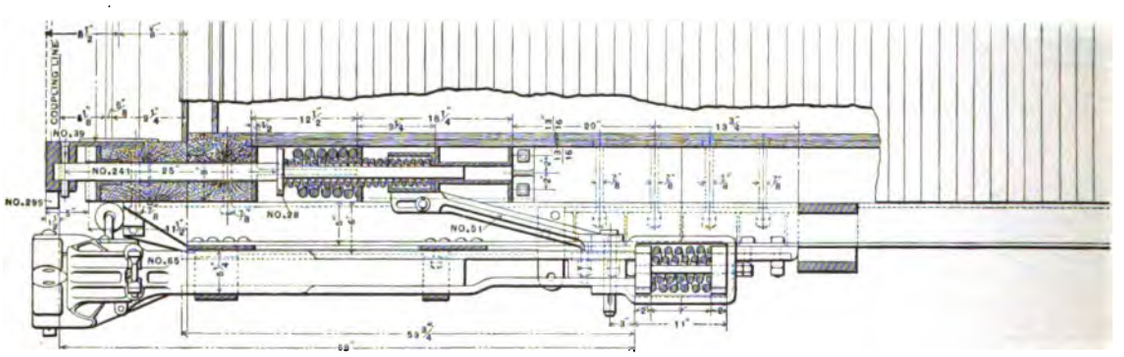


FIG. 1705. SECTION OF GOULD DUMMY VESTIBULE AND DRAFT GEAR FOR BAGGAGE AND EXPRESSCARS.
GOULD COUPLER CO., MAKERS.

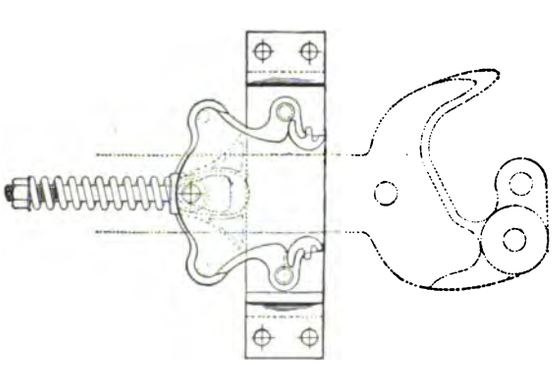


FIG. 1706. On straight track.

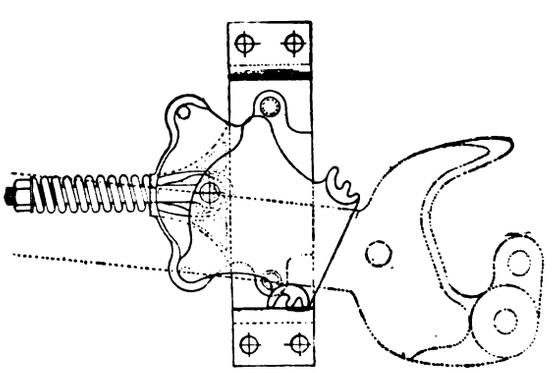
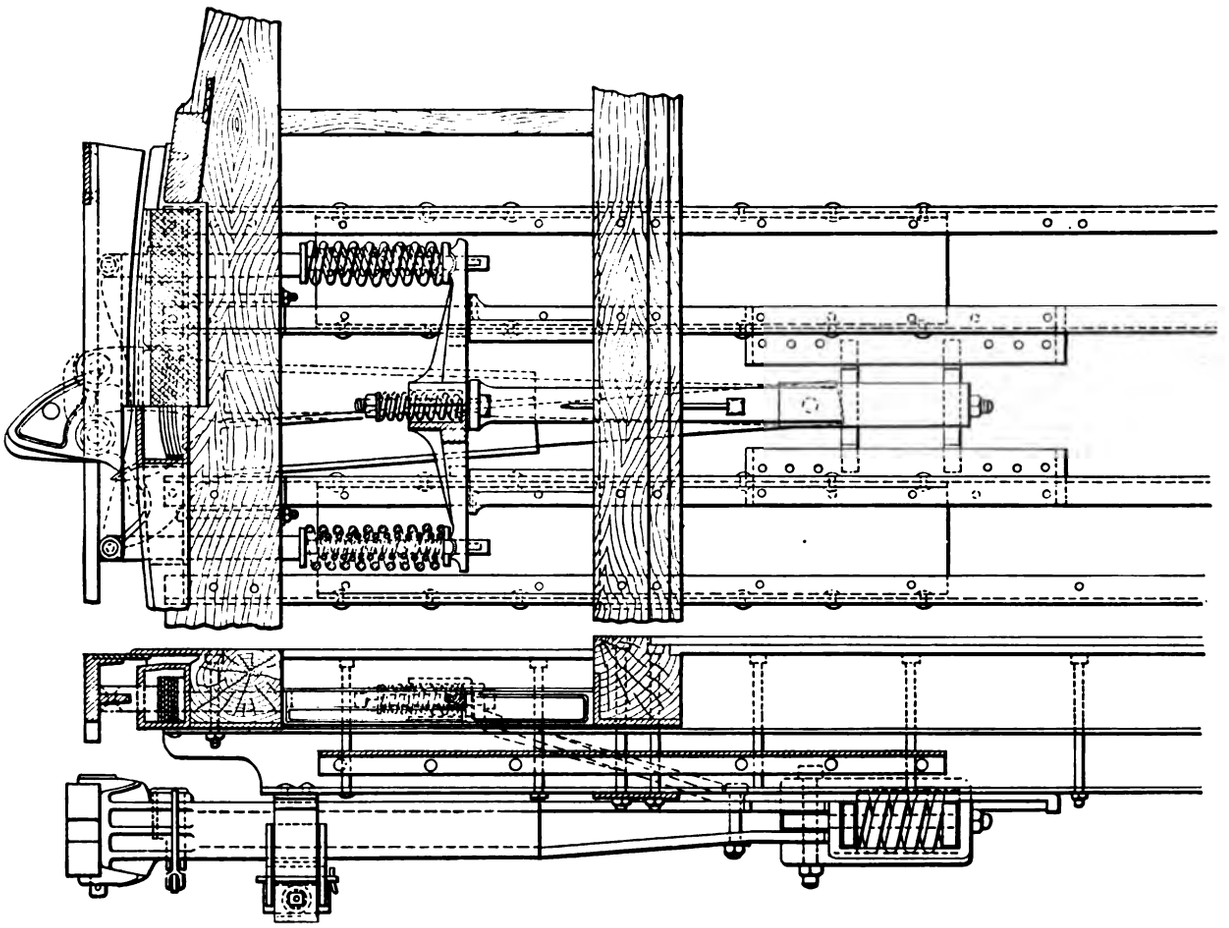


FIG. 1707. On curve.

CHAFFEE DRAWBAR CENTERING DEVICE AS USED ON N. Y. C. & H. R. PASSENGER EQUIPMENT.
FORSYTH BROS. & CO., MAKERS.



FIGS. 1708-1709. PLAN AND SIDE ELEVATION OF NATIONAL PLATFORM AND BUFFER.
NATIONAL CAR COUPLER CO., MAKERS.

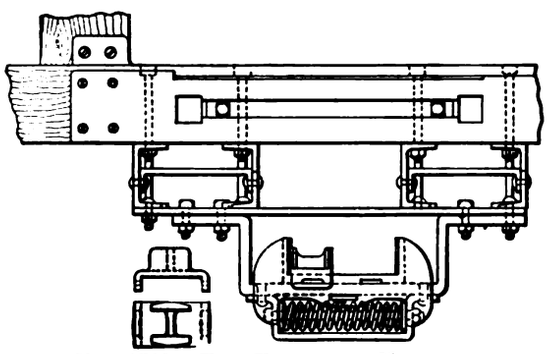


FIG. 1710. END ELEVATION, NATIONAL PLATFORM AND BUFFER.

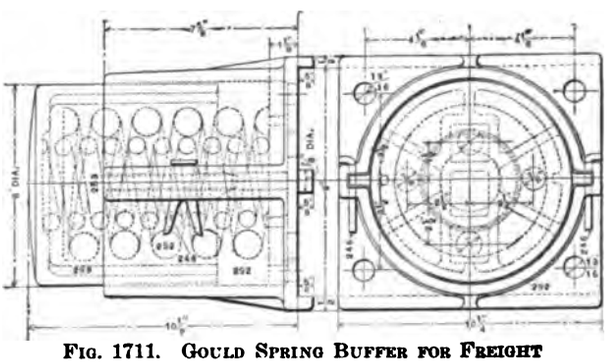


FIG. 1711. GOULD SPRING BUFFER FOR FREIGHT CARS. GOULD COUPLER CO., MAKERS.

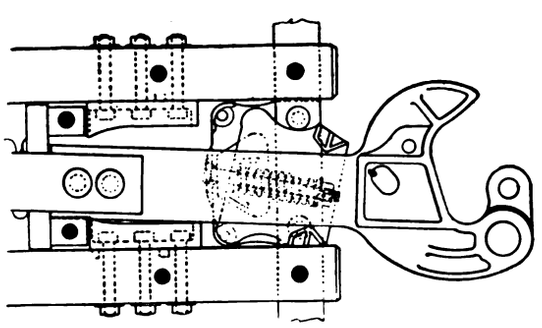


FIG. 1712. On curve.

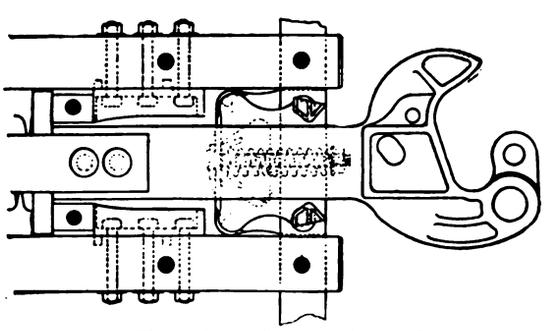


FIG. 1713. On straight track.

CHAFFEE DRAWBAR CENTERING DEVICE FOR FREIGHT EQUIPMENT.
FORSYTH BROS. & CO., MAKERS.

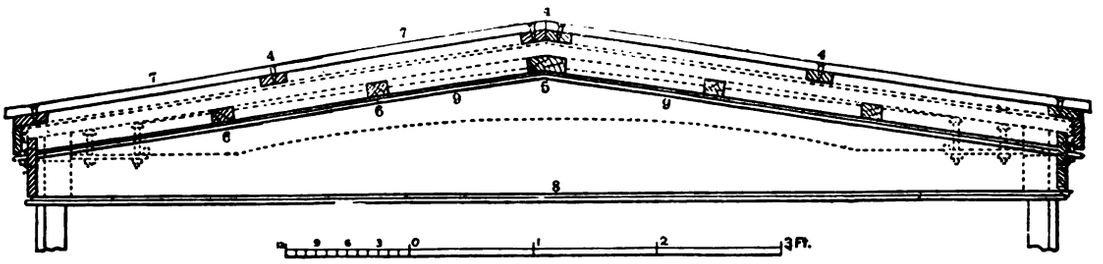


FIG. 1714. TRANSVERSE SECTION.

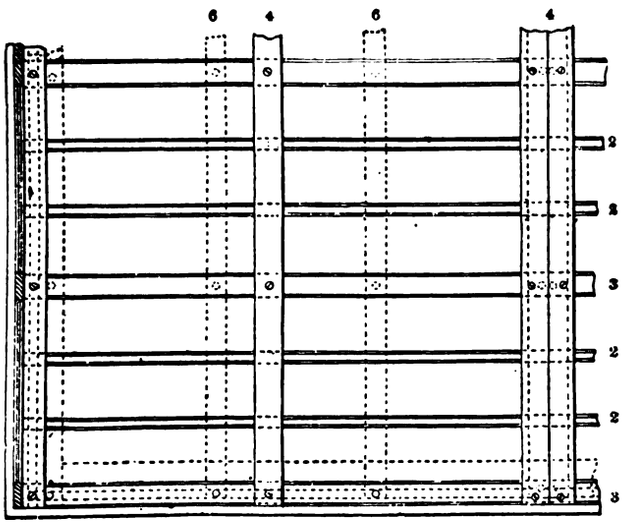


FIG. 1715. PLAN.

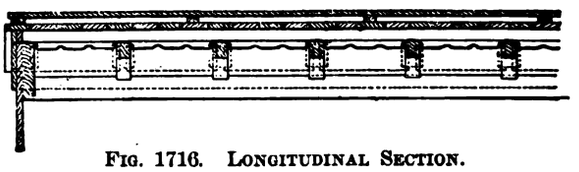


FIG. 1716. LONGITUDINAL SECTION.

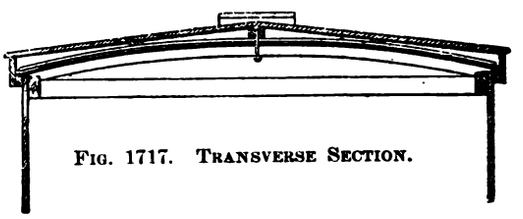


FIG. 1717. TRANSVERSE SECTION.

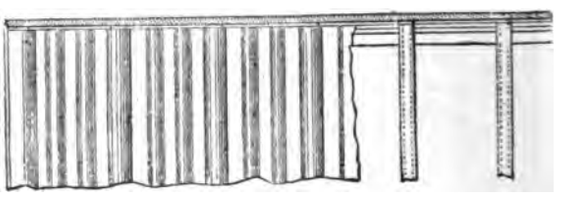


FIG. 1718. PLAN. THE WINSLOW CAR ROOF. (WITH CURVED ROOF SHEETS.)

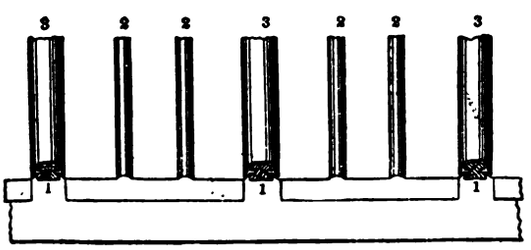


FIG. 1719. LONGITUDINAL SECTION. THE WINSLOW CAR ROOF.

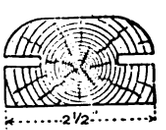


FIG. 1720. SECTION OF JOINT STRIP.

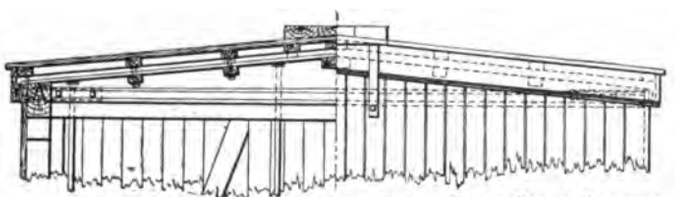


FIG. 1721. HALF CROSS SECTION AND HALF ELEVATION.

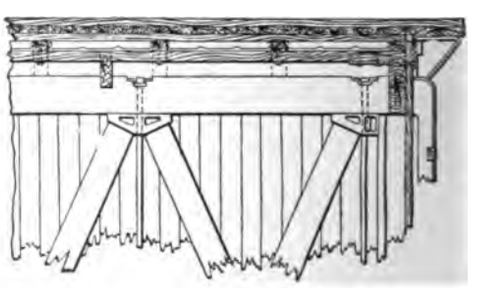


FIG. 1726. PART LONGITUDINAL SECTION.

FIGS. 1722-1723. STRAP BOLTS FOR RIDGE-POLE.

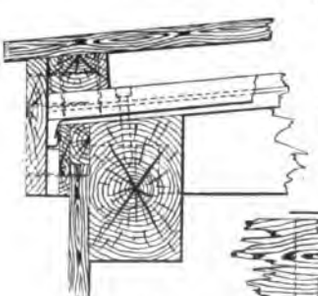


FIG. 1724. CROSS SECTION OF PLATE AND EAVES.

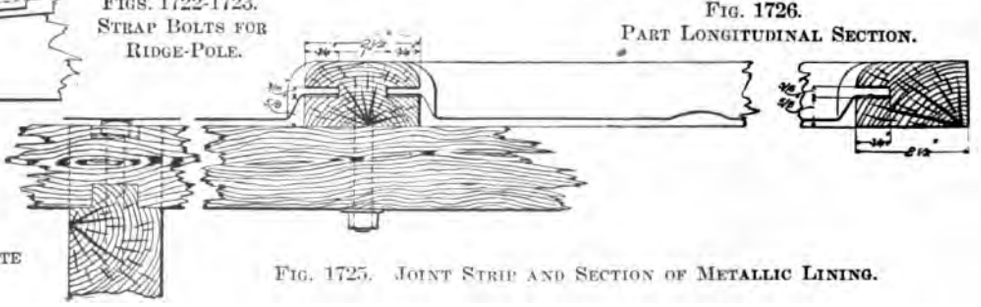
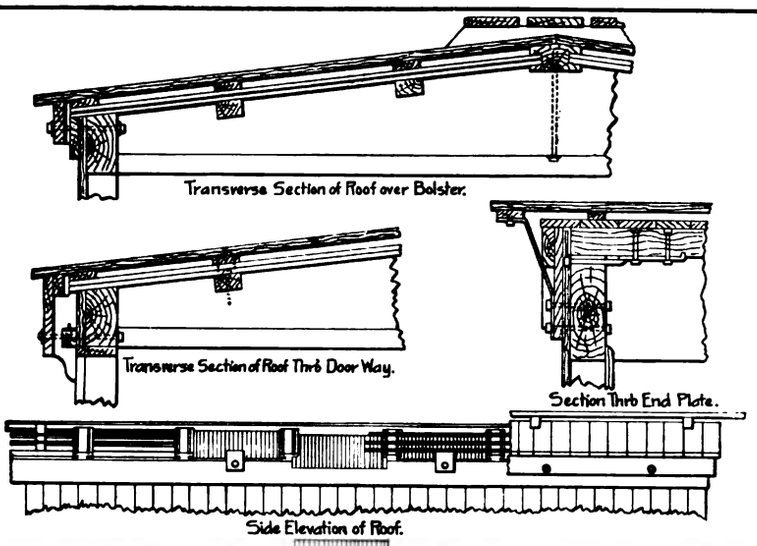
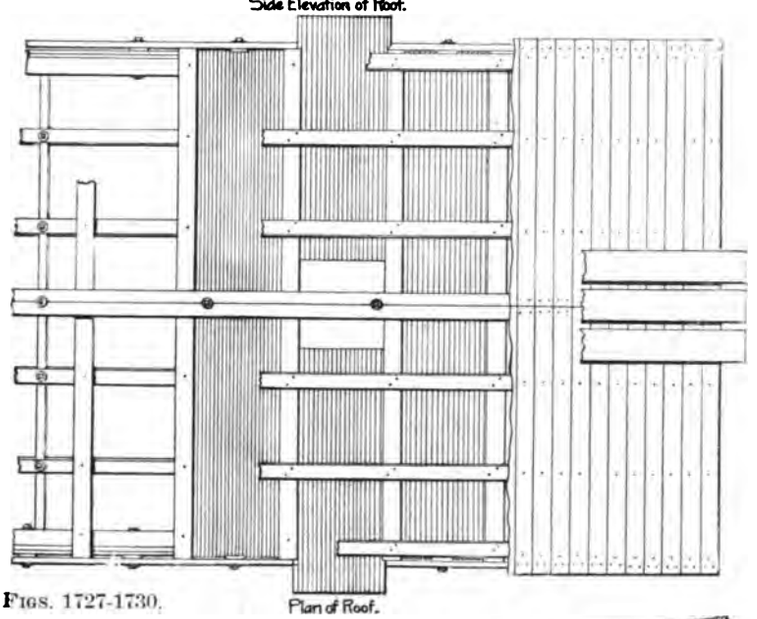


FIG. 1725. JOINT STRIP AND SECTION OF METALLIC LINING.

WINSLOW METALLIC CAR ROOF.


Transverse Section of Roof over Bolster.
Transverse Section of Roof Thro Door Way.
Section Thro End Plate.
Side Elevation of Roof.



FIGS. 1727-1730.

NAMES OF PARTS OF WINSLOW ROOF. FIGS. 1714-1726.

1. *Joint Strip*
2. *Corrugations*
3. *Cover Strip*
4. *Roof Strips*
5. *Ridge Pole*
6. *Purlins*
7. *Roof Boards*
8. *Eaves Fascia Board*
9. *Carline*

NAMES OF PARTS OF THE EXCELSIOR ROOF. FIGS. 1738-1747.

A. *Lower Ridge Pole*
B. *Upper Ridge Pole*
C. *Carline*
D. *Running Boards*
E. *Roof Strips*
F. *Eaves Fascia Board*
G. *Sub Fascia Board*
K. *Galvanized Iron Lining*
L. *Purlins*
P. *Plate*
R. *Roof Board*
S. *Sub Rafter*
T. *Cover Strip for Sub Rafter*

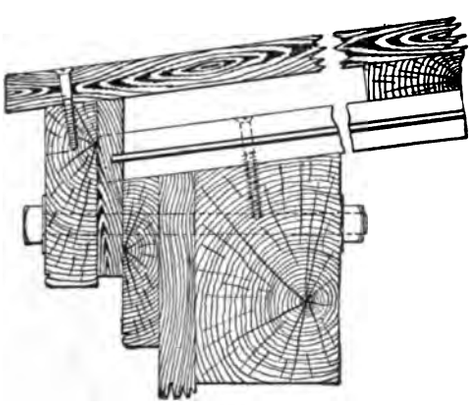


FIG. 1731.
CROSS SECTION THROUGH PLATE AND EAVES.

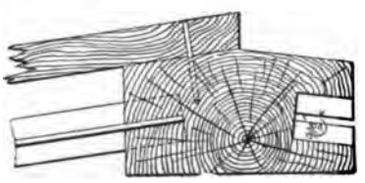


FIG. 1732.
CROSS SECTION OF RIDGE POLE.

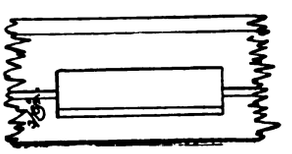


FIG. 1733. PART SIDE ELEVATION OF RIDGE POLE, SHOWING MORTISE.

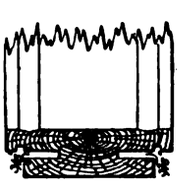


FIG. 1734.
SECTION THROUGH COVER STRIPS.

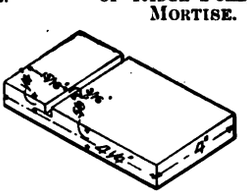


FIG. 1735.
STOP BLOCK.

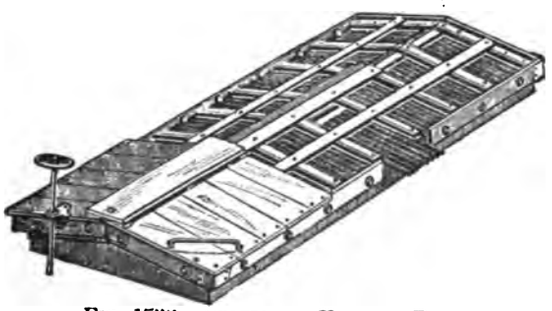


FIG. 1736. SECTIONAL VIEW OF ROOF.
IMPROVED CHICAGO CAR ROOF. CHICAGO-CLEVELAND CAR ROOF CO.

FIG. 1737. DOUBLE BOARD CAR ROOF.

LETTERS REFER TO LIST OF NAMES ON PRECEDING PAGE.

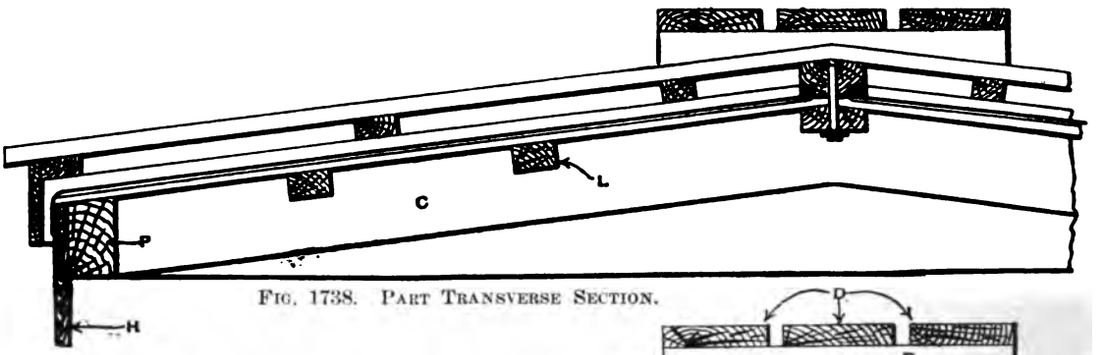


FIG. 1738. PART TRANSVERSE SECTION.

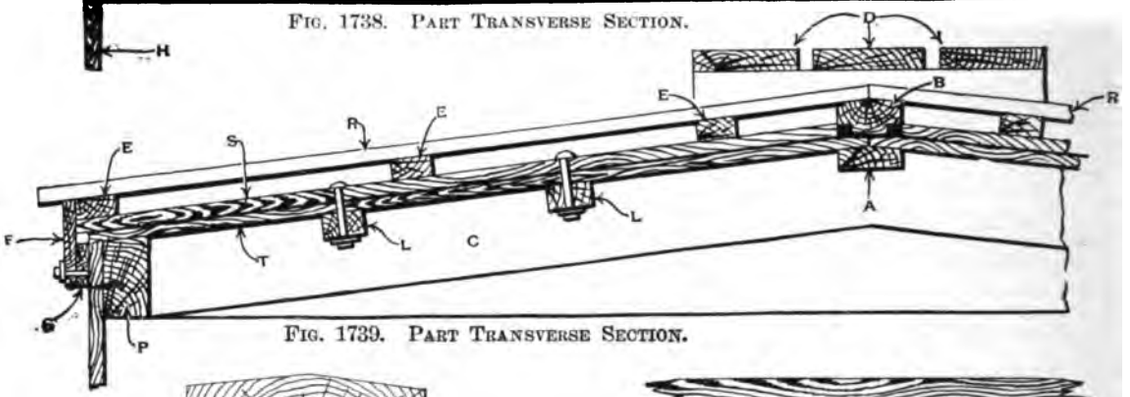


FIG. 1739. PART TRANSVERSE SECTION.

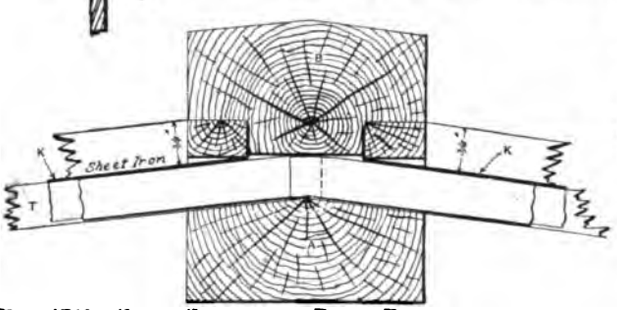


FIG. 1740. CROSS SECTION OF RIDGE POLE.

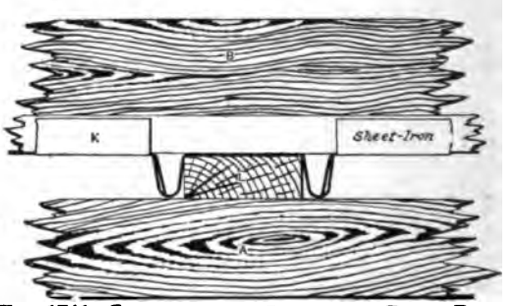


FIG. 1741. LONGITUDINAL SECTION OF RIDGE POLE.

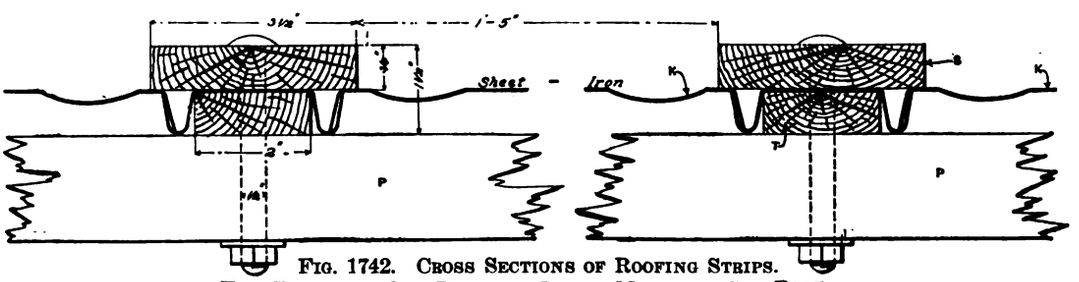


FIG. 1742. CROSS SECTIONS OF ROOFING STRIPS.
THE EXCELSIOR CAR ROOF, AN INSIDE METALLIC CAR ROOF.

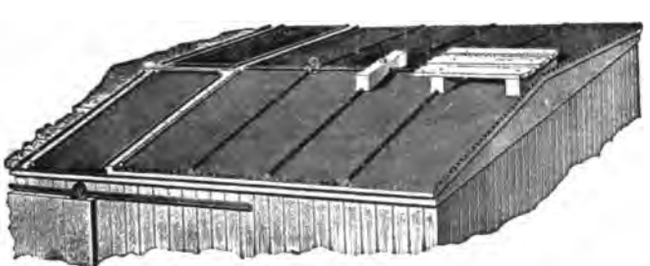


FIG. 1743. EXTERIOR VIEW.

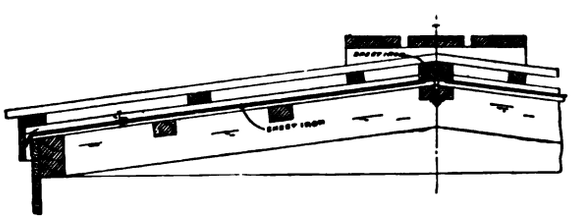


FIG. 1744. TRANSVERSE SECTION.

FIG. 1745.
MALLEABLE
IRON INTEGRAL
CORNER CAP.

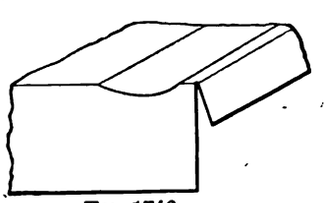


FIG. 1746.
SHEET IRON.

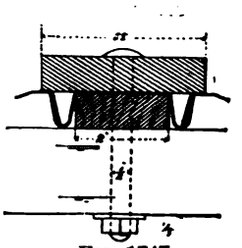


FIG. 1747.
SECTION THROUGH
RIDGE POLE.

THE EXCELSIOR GALVANIZED CAR ROOF. AN OUTSIDE METALLIC ROOF.
THE EXCELSIOR CAR ROOF CO.

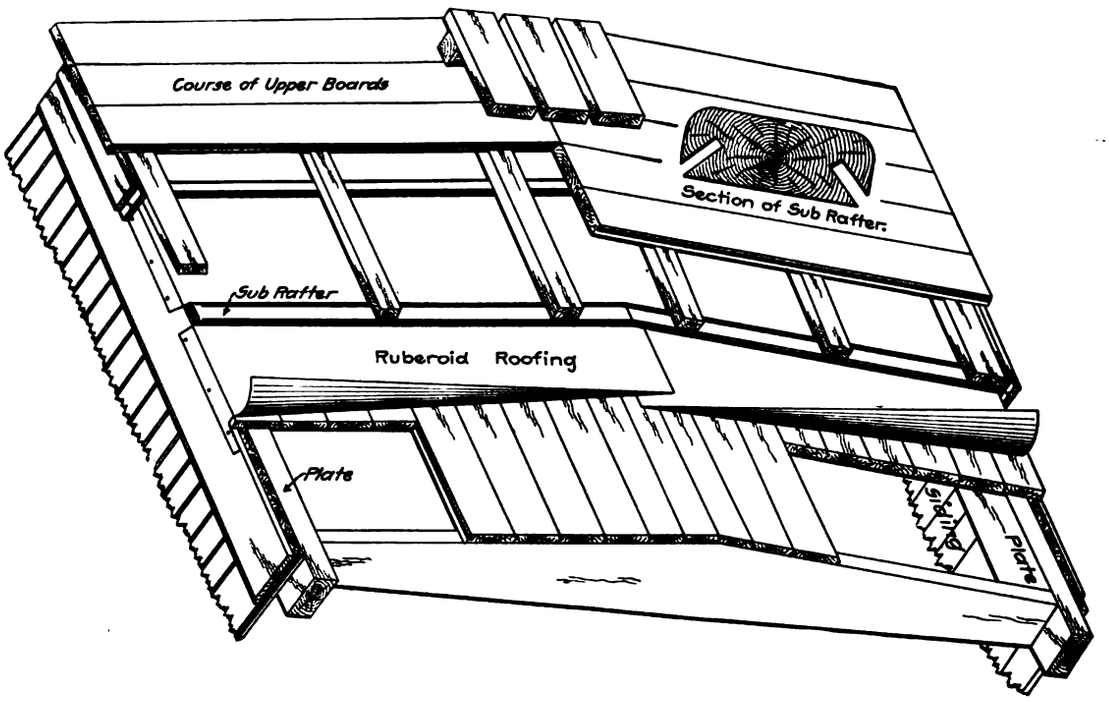
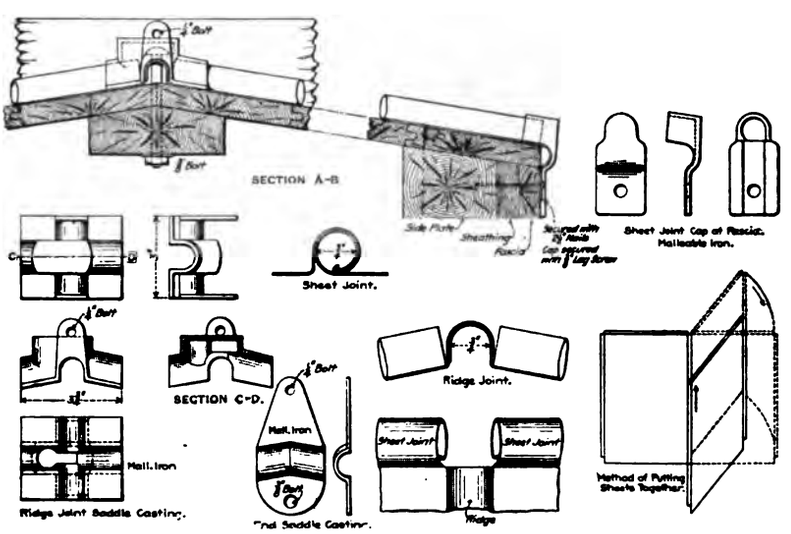
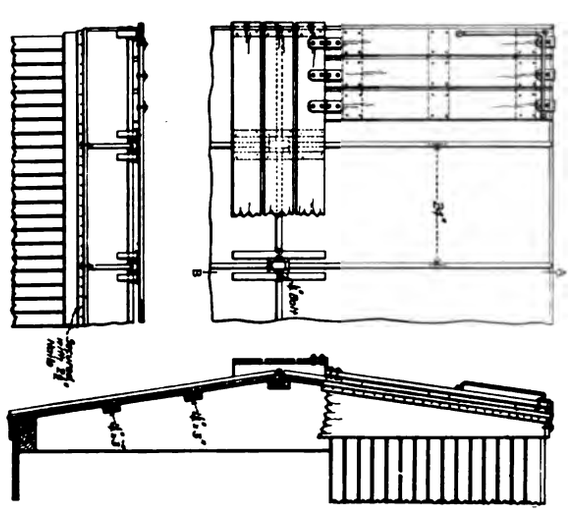


FIG. 1748. RUBEROID FLEXIBLE CAR ROOF. STANDARD PAINT CO.



FIGS. 1749-1763. DETAILS OF HUTCHINS METALLIC ROOF.



FIGS. 1764-1766.
APPLICATION OF HUTCHINS METALLIC ROOF.

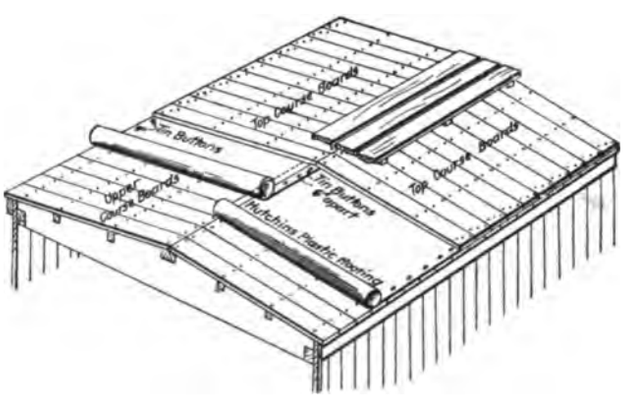


FIG. 1767.
APPLICATION OF HUTCHINS PLASTIC ROOF.

C. B. HUTCHINS & SONS.

FIG. 1768.
MURPHY'S IMPROVED WINSLOW CAR ROOF.

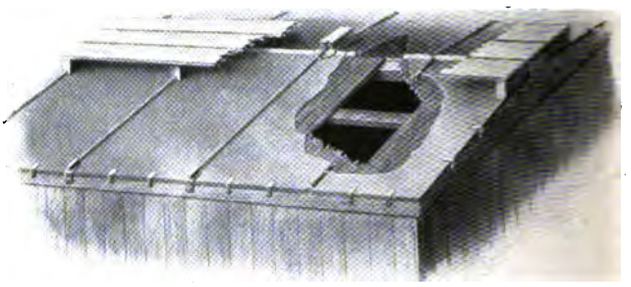


FIG. 1769.
MURPHY'S AMERICAN CAR ROOF. OUTSIDE METALLIC ROOF.
STANDARD RAILWAY EQUIPMENT CO.

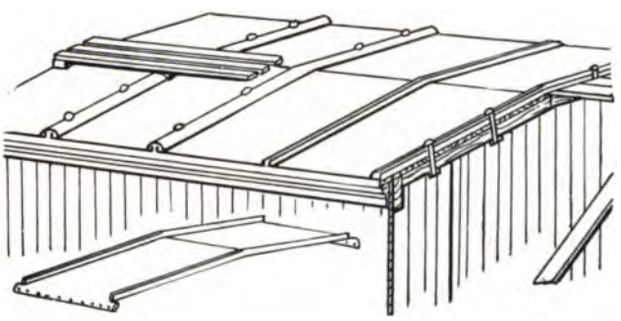
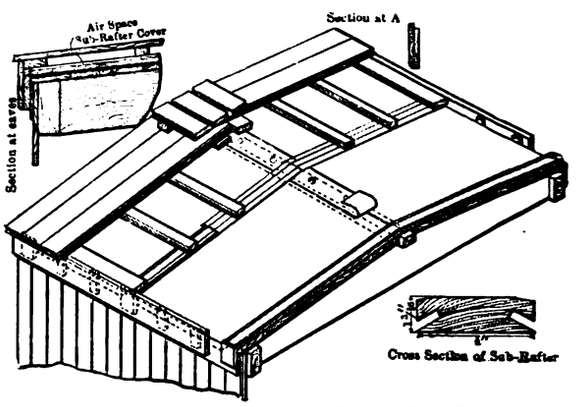


FIG. 1770. OUTSIDE IRON ROOF.
ALLISON MANUFACTURING CO.



FIGS. 1771-1774. TORSION PROOF CAR ROOF.
F. W. BIRD & CO.

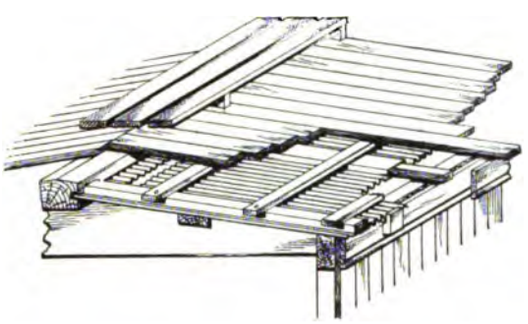


FIG. 1775. CORRUGATED INSIDE IRON ROOF.
DRAKE & WEIRS CO.

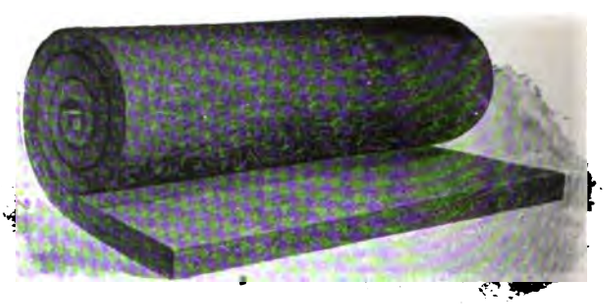


FIG. 1776. CAREY'S PLASTIC ROOFING.

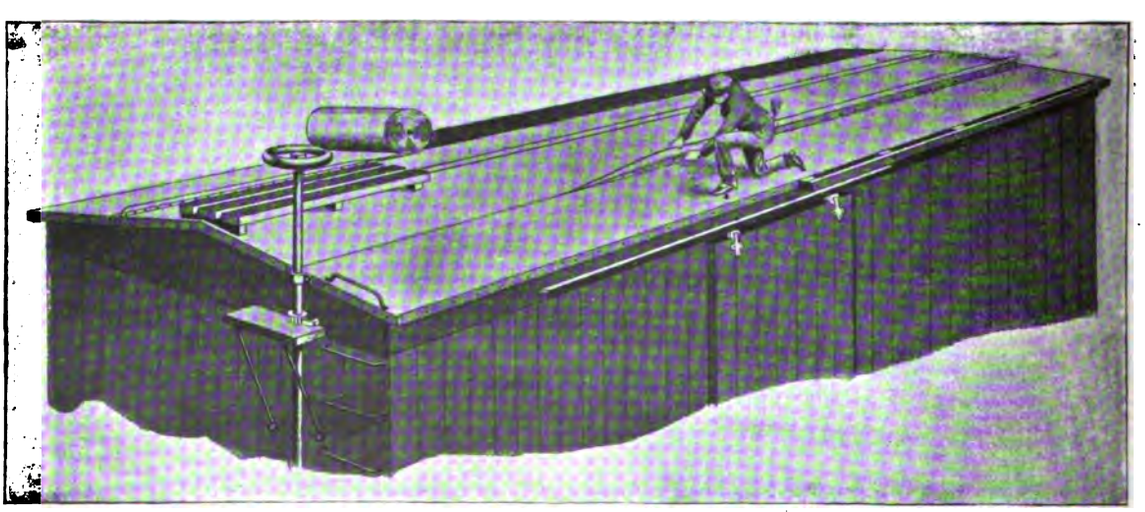


FIG. 1777. APPLICATION OF CAREY'S PLASTIC ROOFING.
PHILIP CAREY MFG. CO.

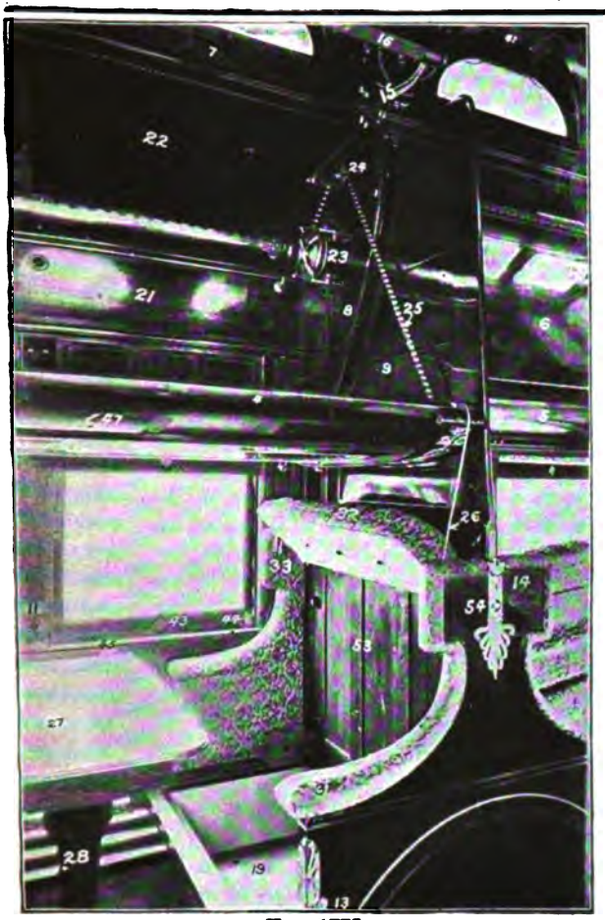


FIG. 1778.
PART PERSPECTIVE VIEW OF A SECTION OF A SLEEPING CAR, WITH CUSHIONS REMOVED AND SHOWING PILLOW BOX, UPPER BERTH HANGINGS, HEAD BOARD AND TABLE.

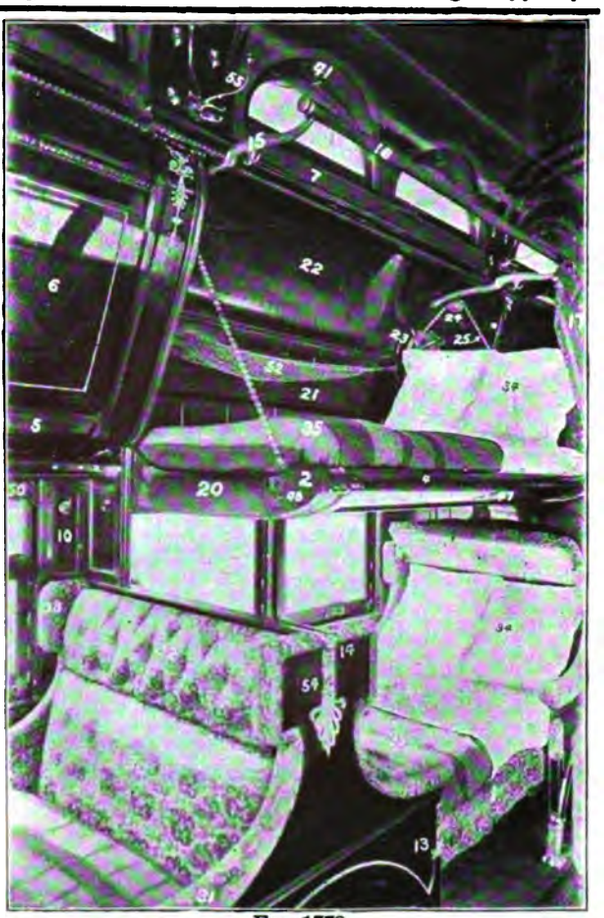


FIG. 1779.
PERSPECTIVE VIEW OF A SECTION OF A SLEEPING CAR, WITH THE UPPER AND LOWER BERTHS MADE UP, EXCEPT THE HEAD BOARD AND CURTAINS.

SLEEPING CAR SECTIONS AND BERTHS. PULLMAN CO.

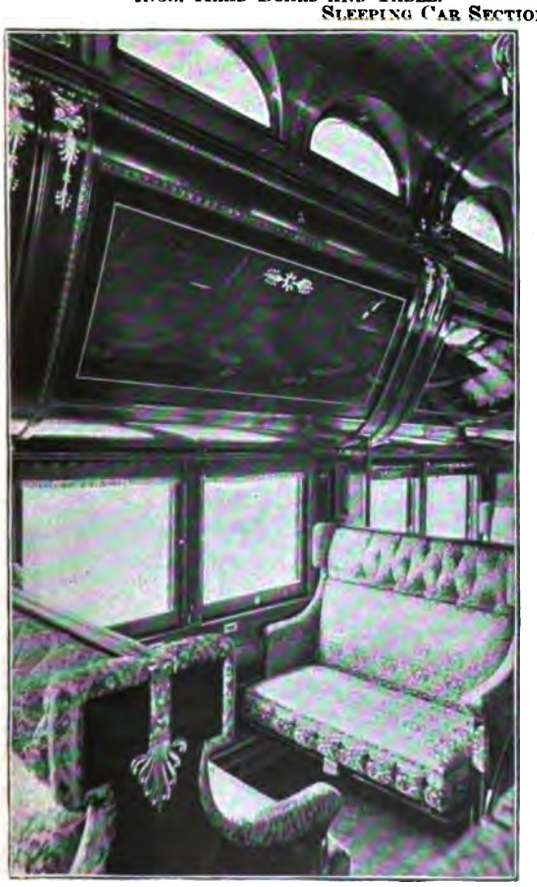


FIG. 1780.
PERSPECTIVE VIEW OF A SECTION OF A SLEEPING CAR, ARRANGED FOR DAY TRAVEL. PULLMAN CO.

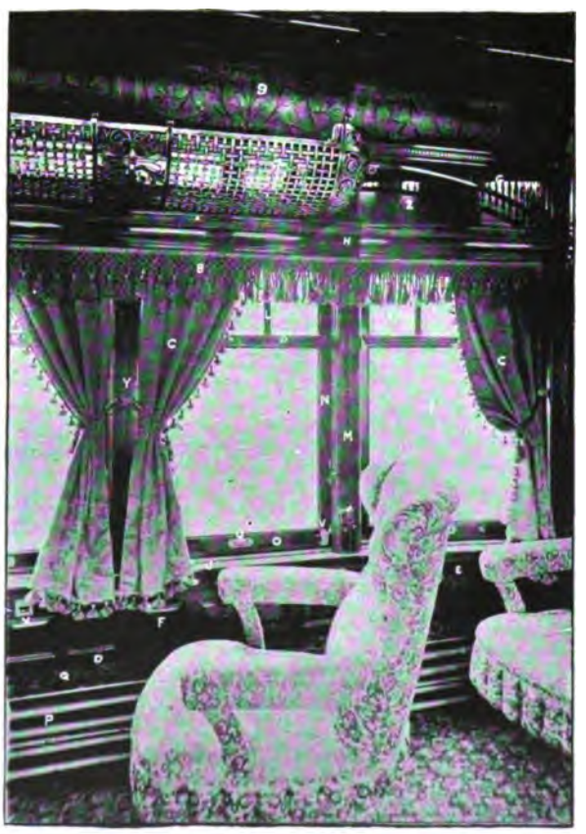


FIG. 1781.
PERSPECTIVE VIEW OF PARLOR CAR WINDOW.

NUMBERS REFER TO LISTS OF NAMES ON NEXT PAGE.

NUMBERS REFER TO LISTS OF NAMES OF PARTS BELOW.

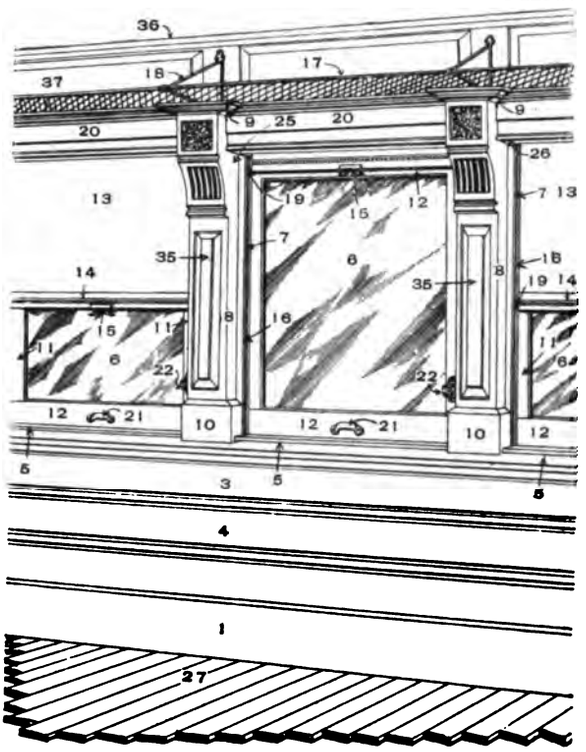


FIG. 1782. PERSPECTIVE VIEW OF A COACH WINDOW.

NAMES OF PARTS OF SLEEPING-CAR SECTIONS. FIGS. 1778-1780, 1783.

1. *Lower Berth*
2. *Upper Berth*
3. *Upper Berth (folded up)*
4. *Berth Front, Upper Part*
5. *Berth Front, Lower Part*
6. *Berth Front Panel*
7. *Bunk Apron, or Deck Sill Facing*
8. *Berth Partition*
9. *Head Board*
10. *Inside Window Panel*
11. *Pilaster, between Windows*
12. *Wainscot Panel*
13. *Seat End*
14. *Seat Head End*
15. *Curtain Rod Folding Bracket*
16. *Berth Curtain Rod or Pole*
17. *Berth Curtain*
18. *Berth Mattresses*
19. *Pillow Box*
20. *Bunk End*
21. *Bunk Panel*
22. *Lower Deck Ceiling*
23. *Berth Spring and Frame*
24. *Berth Chain Pulley*
25. *Berth Chain*
26. *Berth Safety Rope*
27. *Card or Writing Table*
28. *Table Leg*
29. *Seat Cushion. (The cushion pulls out, and the back takes the place of the cushion, and together they form the lower berth.)*
30. *Seat Back*
31. *Seat Arm, Upholstered*
32. *Head Rest and Head Board Pocket. (The upholstered head rest lifts up about its hinged top and forms a pocket for day wearing apparel.)*
33. *Upholstered Inner Seat End*
34. *Pillow*
35. *Blankets*
36. *Deck Window Screen*
37. *Vaulted Compound Carline Decorations*
38. *Vaulted Deck Ceiling*
39. *Lamp Dome*
40. *Center Lamp*
41. *Vaulted Deck Window*
42. *Cross Section of Car Side*
43. *Window Sash Lift*
44. *Window Stop*
45. *Table Hook*
46. *Table Hook Plate*
47. *Berth Catch Handle*
48. *Berth Catch*
49. *Lower Berth Stop Bar*
50. *Window Shade*
51. *Window Shade Thumb Latch*
52. *Hammock*
53. *Seat Back Paneling*
54. *Head Board Bolt and Lock*
55. *Hat Posts*

NAMES OF PARTS OF WINDOWS. FIG. 1781.

B. *Window Valances*
C. *Drapery Curtain*
D. *Lower Wainscot Rail*
E. *Upper Wainscot Rail*
F. *Wainscot Panel*
G. *Wood Grille*
H. *Inside Window Cornice*
J. *Inside Window Sill*
L. *Mullion of Upper Sash*
M. *Molding of Window Post*
N. *Window Sash Stile*
O. *Window Sash Rail*
P. *Hot Water Pipes*
Q. *Hot Water Pipe Guard Rail*
R. *Basket or Bundle Rack*
S. *Lower Sash*
T. *Upper Sash, Leaded Glass*
U. *Window Lift*
V. *Window Stop*
W. *Electric Push Button*
X. *Table Hook Plate*
Y. *Curtain Hook*
Z. *Inside Cornice Sub Fascia Board*

NAMES OF PARTS OF COACH WINDOW. FIG. 1782.

1. *Truss Plank*
2. *Lower Wainscot Rail*
3. *Upper Wainscot Rail*
4. *Wainscot Panel*
5. *Inside Window Sill*
6. *Window, or Window Glass*
7. *Window Casing, or Inside Window Stop*
8. *Window Pilaster*
9. *Pilaster Cap*
10. *Base of Pilaster*
11. *Window Stile*
12. *Window Rail, or Sash*
13. *Shade*
14. *Bottom Bar of Shade*
15. *Shade Thumb Latch or Lift*
17. *Continuous Basket Rack*
18. *Basket Rack Bracket*
19. *Window Shade Stop*
20. *Window Casing or Cap Molding*
21. *Window Lift*
22. *Window Latch*
25. *Pilaster Cap Bracket*
26. *Window Cove Molding*
27. *Car Floor*
36. *Inside Cornice*
37. *Inside Cornice Sub Fascia Board, or Paneling*

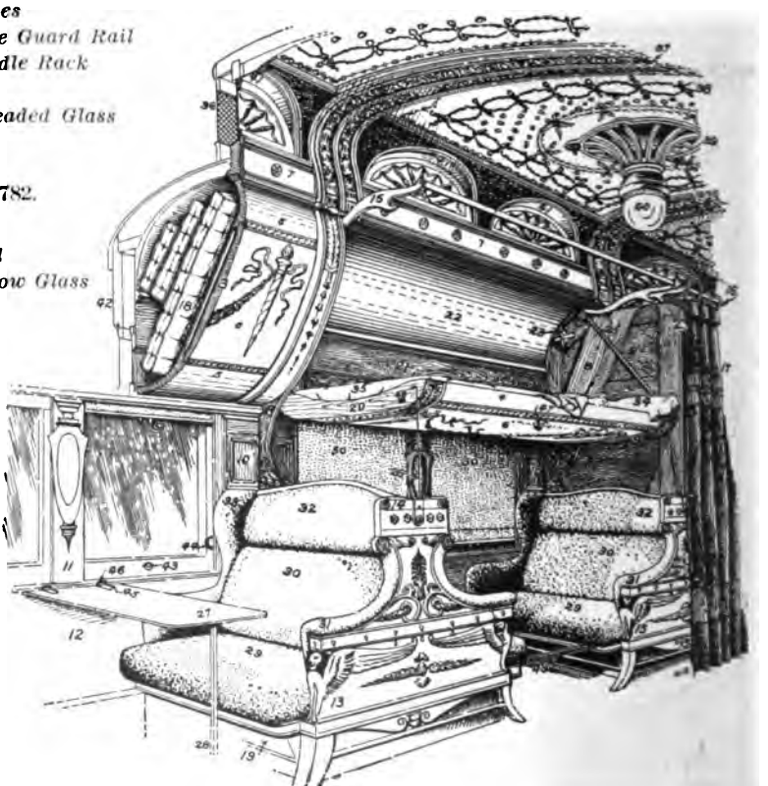
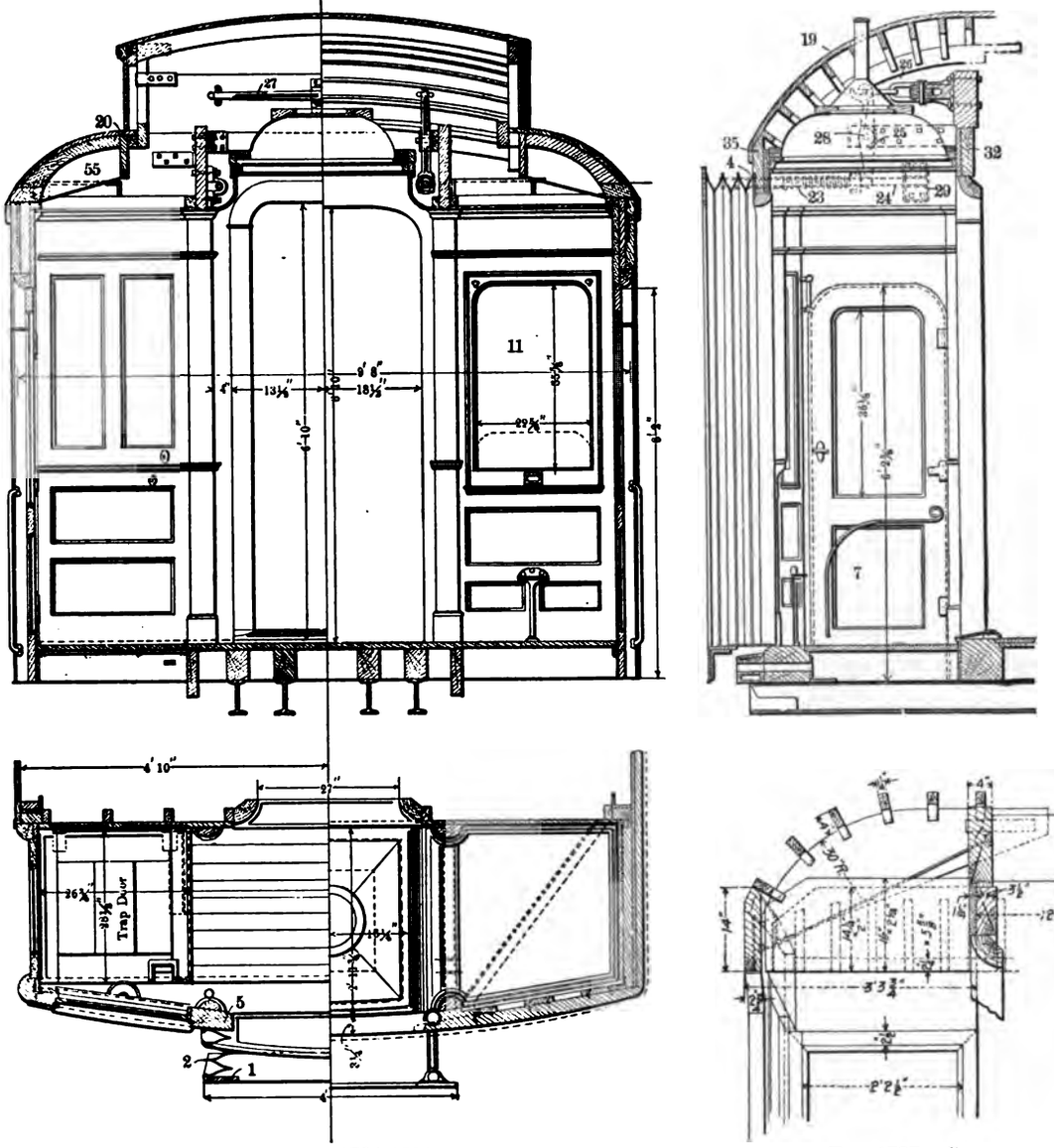


FIG. 1783. PERSPECTIVE VIEW OF A SECTION OF A SLEEPING CAR, THE UPPER BERTH PARTLY MADE UP.
THE COLUMBIAN STYLE OF SLEEPING CAR SECTION. PULLMAN CO.

NUMBERS REFER TO LIST OF NAMES ON NEXT PAGE.



FIGS. 1784-1786.
PLAN, ELEVATION AND SECTION OF PULLMAN STANDARD WIDE VESTIBULE.

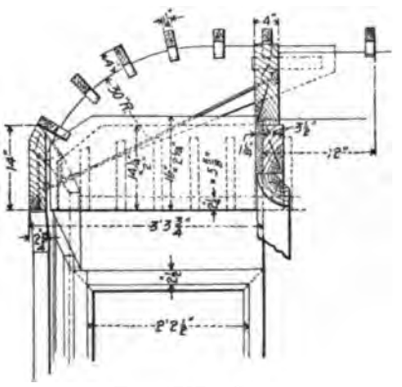
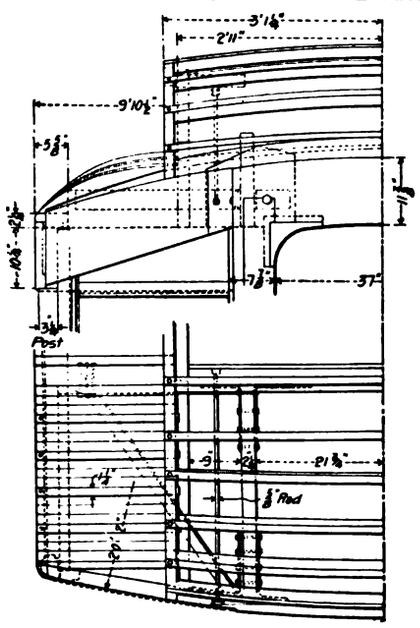
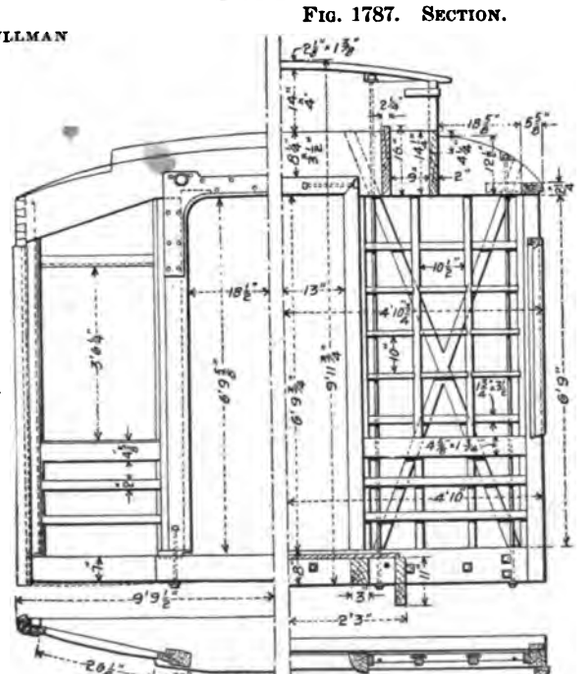


FIG. 1787. SECTION.



FIGS. 1788-1789. ROOF FRAMING.



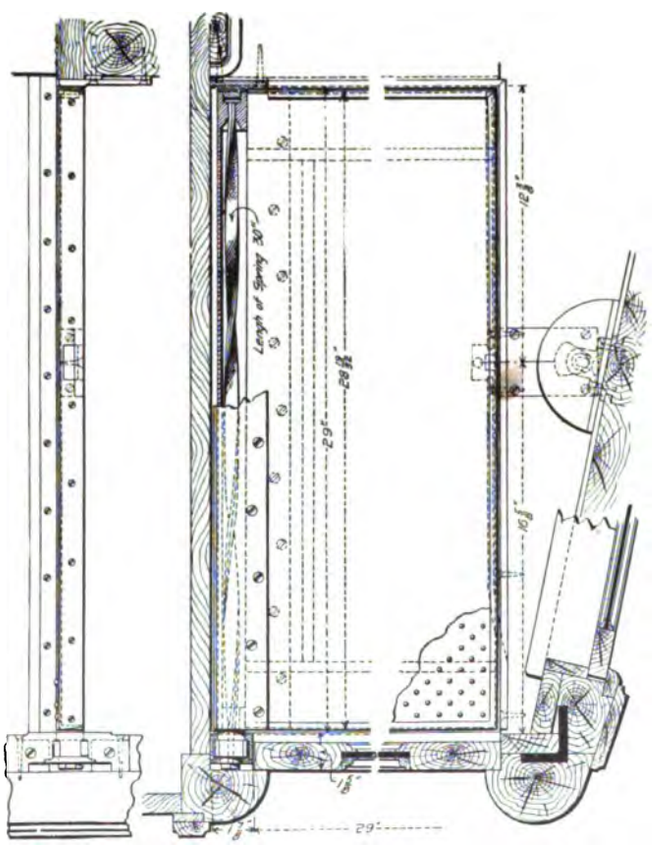
FIGS. 1790-1793. END FRAMING.

VESTIBULE FRAMING, FIRST CLASS COACH. N. Y., N. H. & H.

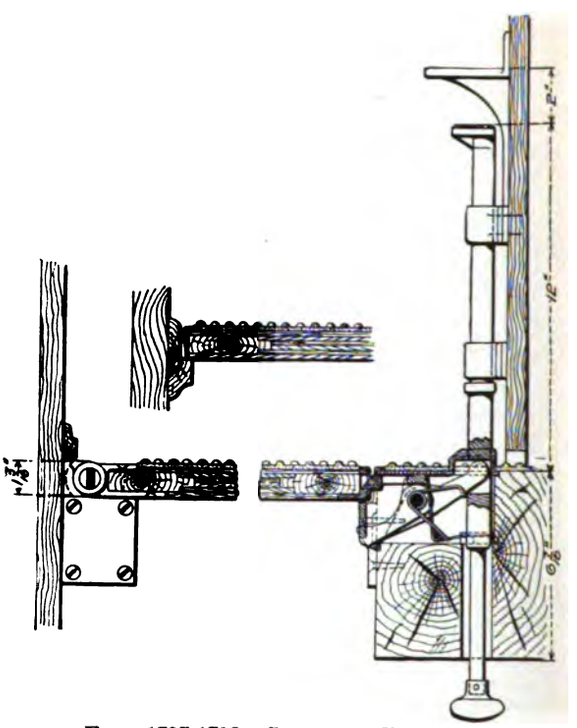
NAMES OF PARTS OF VESTIBULES.
FIGS. 1784-1786.

1. *Diaphragm Face Plate*
2. *Diaphragm*
4. *Inner Face Plate*
5. *End Post*
7. *Vestibule Door*
11. *Vestibule End Windows*
19. *Vestibule Hood*
20. *Platform Hood*
23. *Overhead Equalizer Spring*
24. *Face Plate Piston*
25. *Vertical Equalizing Lever*
26. *Equalizer Connecting Chain*
27. *Horizontal Equalizing Lever*
28. *Vertical Lever Clevis*
29. *Face Plate Piston Guide*
32. *Body End Plate*
35. *Vestibule End Carline*
55. *Hood Brace*

FIG. 1794. GOULD WIDE VESTIBULE.
GOULD COUPLER CO., MAKERS.



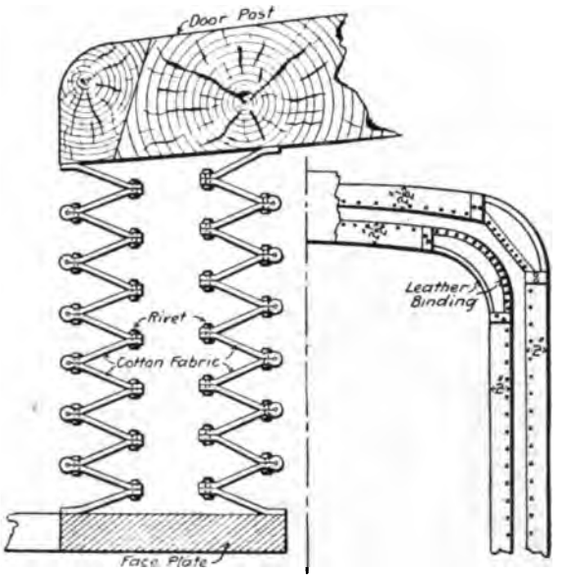
FIGS. 1795-1796. PLAN.



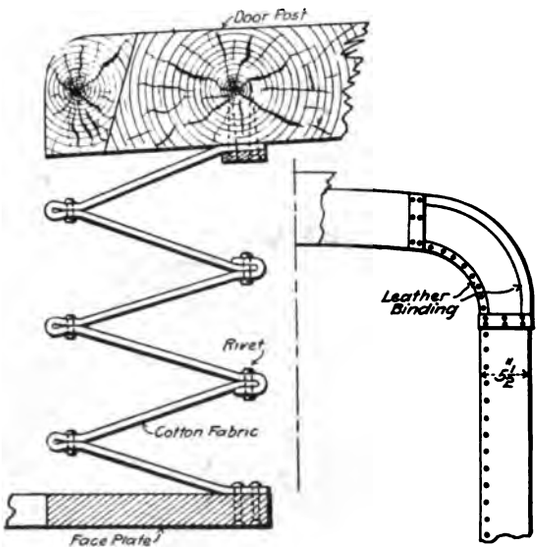
FIGS. 1797-1798. SECTIONAL ELEVATION.

EDWARDS VESTIBULE TRAP DOOR FIXTURE.

O. M. EDWARDS CO.

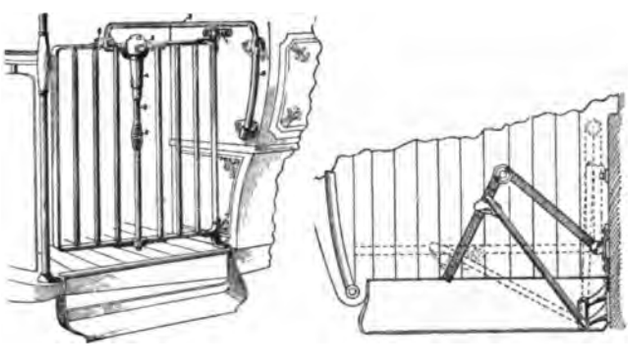


FIGS. 1799-1800.
AJAX DIAPHRAGM FOR GOULD VESTIBULE.



FIGS. 1801-1802.
AJAX DIAPHRAGM FOR PULLMAN VESTIBULE.

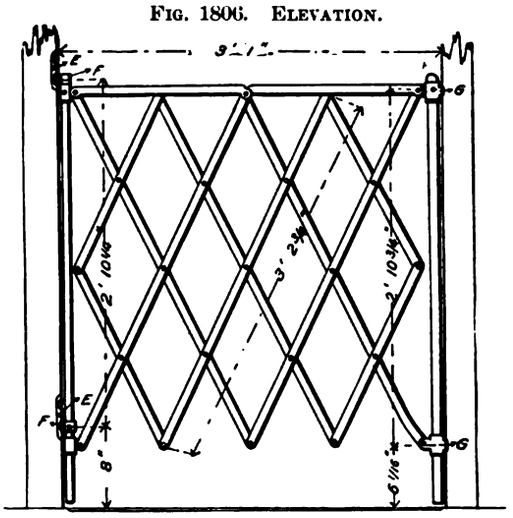
E. J. WARD CO.



FIGS. 1803-1804.
BLISS FOLDING PLATFORM GATE.
R. BLISS MFG. CO.

FIG. 1805. ACME VESTIBULE DIAPHRAGM.
G. S. WOOD & CO.

FIG. 1806. ELEVATION.



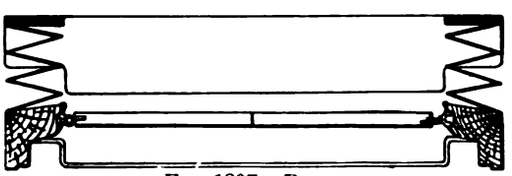


FIG. 1807. PLAN.
PULLMAN ADJUSTABLE GATE FOR VESTIBULES.

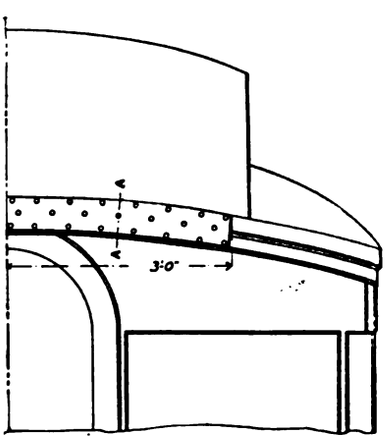


FIG. 1808.
HOOD CARLINE FACE PLATE.
Applied to cars with vestibules to prevent diaphragm face plate from crushing hood carlines.

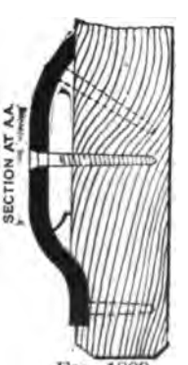


FIG. 1809.

Fig. 1810.

Fig. 1811.

Fig. 1812.
Bell Cord Bushings. A. & W.

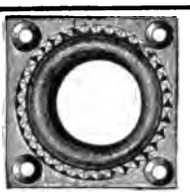


Fig. 1813.

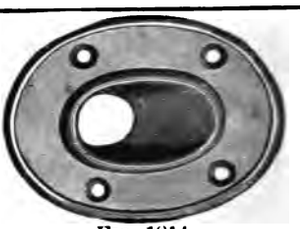


Fig. 1814.
Beveled Bell Cord Bushing.
A. & W.

Fig. 1815. Beveled Bell Cord Bushing.
A. & W.

Fig. 1820. Valve Cord Hook.
Samson Cordage W'ks.

Figs. 1816-1818. Bell Cord
Bushings with Pulley. A. & W.

Fig. 1819. Quartet
Bell Cord Bushing.
A. & W.

Fig. 1821. Socket Snap.
Samson Cordage W'ks.

Fig. 1822. Bell Cord Splice.
A. & W.

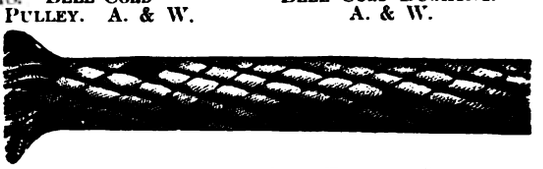


Fig. 1823. Samson Spot Trolley Cord.
Samson Cordage W'ks.

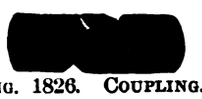


Fig. 1826. Coupling.

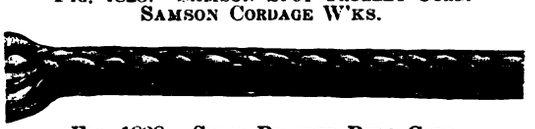


Fig. 1828. Solid Braided Bell Cord.
Samson Cordage W'ks.

Figs. 1824-1825. Bell Cord
Couplings. D. M. Co.

Fig. 1827. Bell Cord Coupling.
A. & W.

Fig. 1829. Attachment of Bell Cord
to Coupling. Samson Cordage W'ks.

Fig. 1830.
D. M. Co.

Fig. 1831.
A. & W.
Guides with Screw.

Fig. 1832.
D. M. Co.

Fig. 1833.
Guide with
Screw and
Flange.

Fig. 1834.
Guide with
Screw.
A. & W.

Fig. 1835.
Guide with
Flange.
D. M. Co.

Fig. 1836.
Guide with
Screw.
A. & W.

Fig. 1837.
A. & W.

Fig. 1838.
D. M. Co.

Fig. 1839.
A. & W.
Overhead Guides with Screw and Pulley.

Fig. 1840.
D. M. Co.

Fig. 1841.
A. & W.

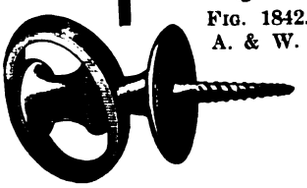


Fig. 1843.
D. M. Co.
Side Guides with Screw
and Pulley.

Fig. 1842.
A. & W.

Fig. 1844.
D. M. Co.
Overhead Swing Guide
with Two Pulleys.

Note. The abbreviations, A. & W. and D. M. Co. are for The Adams and Westlake Co. and The Dayton M'fg. Co. respectively, who are the makers.

FIG. 1845.

FIG. 1846.

FIG. 1847.

PULLEY GUIDES WITH FLANGES.

FIG. 1848. D. M. Co.

FIG. 1849. D. M. Co.

FIG. 1850. A. & W.

SIDE PULLEY GUIDES WITH FLANGES.

FIG. 1851. OVERHEAD GUIDE WITH PULLEY, FLANGE AND STEM. D. M. Co.

FIG. 1852. CORNER GUIDE WITH PULLEY. A. & W.

FIG. 1853.

FIG. 1854. SWING GUIDES WITH PULLEYS. D. M. Co.

FIG. 1855. A. & W.

FIG. 1856. D. M. Co.

ANGLE GUIDES WITH FLANGE AND PULLEYS.

FIG. 1857. A. & W.

FIG. 1858. A. & W.

FIG. 1859. A. & W.

FIG. 1860. A. & W.

FIG. 1861. A. & W.

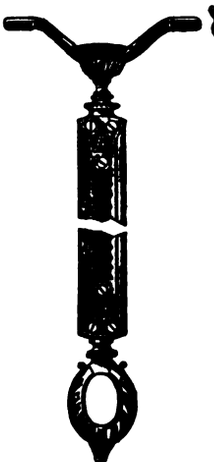


FIG. 1862. D. M. Co.

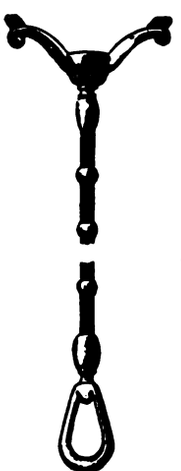


FIG. 1863. A. & W.

FIG. 1864. D. M. Co.

BELL CORD STRAP HANGERS.

FIG. 1865. A. & W.

FIG. 1866. D. M. Co.

FIG. 1867. A. & W.

FIG. 1868. D. M. Co.

FIG. 1869. D. M. Co.

BELL CORD STRAP HANGERS WITH DECORATED BRACKETS.

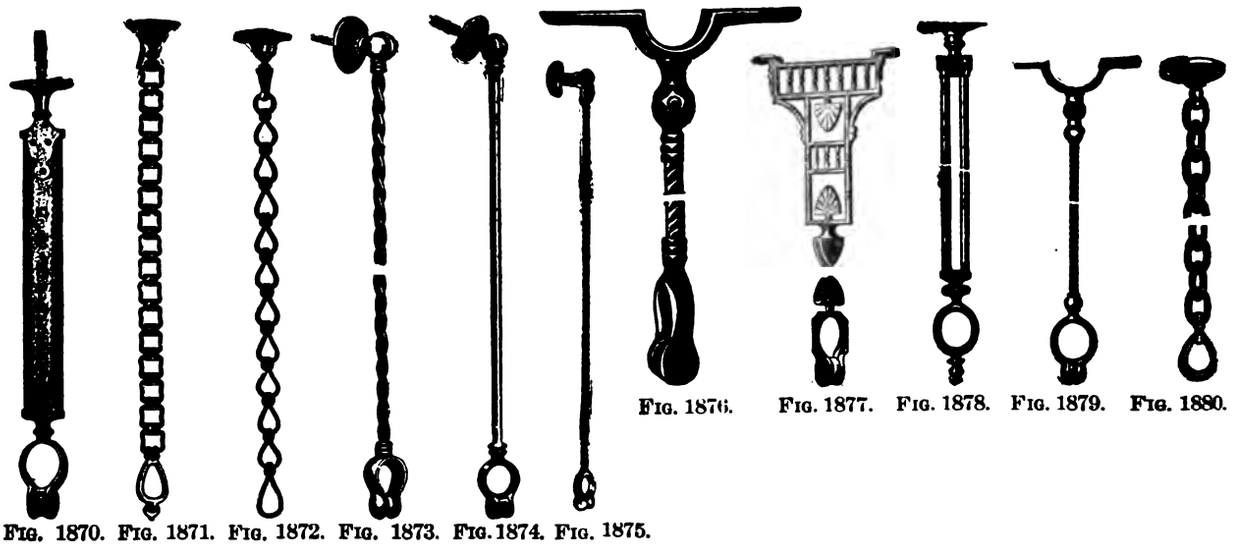


FIG. 1870. FIG. 1871. FIG. 1872. FIG. 1873. FIG. 1874. FIG. 1875. FIG. 1876. FIG. 1877. FIG. 1878. FIG. 1879. FIG. 1880.

BELL CORD BAND, CHAIN AND ROD HANGERS. A. & W.

FIG. 1881. FIG. 1882. FIG. 1883. FIG. 1884. FIG. 1885. FIG. 1886. FIG. 1887. FIG. 1888.

A. & W. BELL CORD HANGER STRAPS. D. M. Co.

FIG. 1889.

BARREL DOOR BOLT WITH BENT STAPLE PLATE.

FIG. 1890.
BARREL DOOR BOLT AND KEEPER.

FIG. 1891.
BARREL DOOR BOLT WITH NECKED STAPLE.

FIGS. 1892-1893.
ROUND NECKED DOOR BOLT AND PLATE.

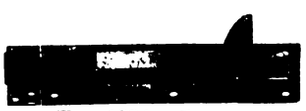


FIG. 1894. SQUARE DOOR BOLT AND KEEPER.

FIG. 1895. FIGS. 1896-1897.
KEEPER. SQUARE NECK DOOR BOLT AND PLATE.

FIG. 1898. BARREL DOOR BOLT WITH KEEPER. A. & W.

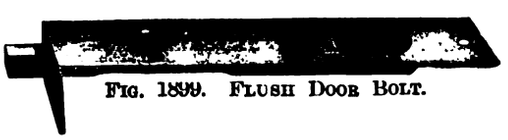
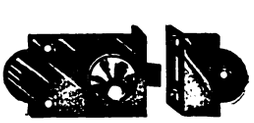


FIG. 1899. FLUSH DOOR BOLT.

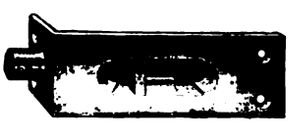
FIG. 1900.
STAPLE WITH BENT STRIKING PLATE.

FIG. 1901.
FLUSH DOOR BOLT. A. & W.



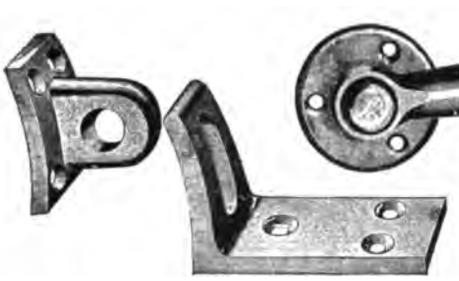
FIGS. 1902-1903.

FIGS. 1904-1905. A. & W.
CUPBOARD CATCHES AND BOLTS.

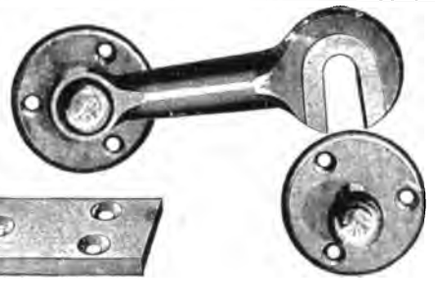


FIGS. 1906-1907. CUPBOARD CATCHES OR FLUSH BOLTS. A. & W.

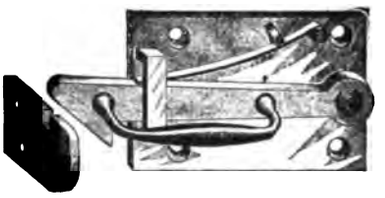
FIGS. 1908-1909. VESTIBULE DOOR BOLT. A. & W.



FIGS. 1910-1911. SLIDING DOOR HASP AND STAPLE FOR MAIL CAR. A. & W.



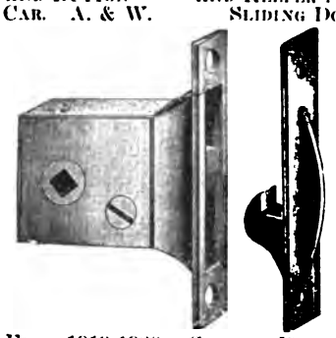
FIGS. 1912-1913. SLIDING DOOR HOOK AND BUTTON FOR BAGGAGE CAR. A. & W.



FIGS. 1914-1915. SPRING LATCH AND KEEPER FOR BAGGAGE CAR SLIDING DOOR. A. & W.

FIG. 1916. SLIDING DOOR FLUSH LOCK.

FIGS. 1917-1918. SLIDING DOOR LATCH. D. M. CO.



FIGS. 1919-1920. SLIDING DOOR MORTISE LATCH. D. M. CO.

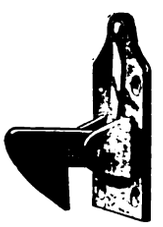
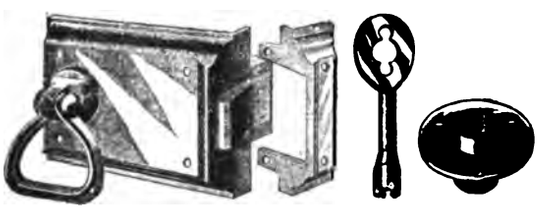


FIG. 1921. SPRING LATCH.

FIGS. 1922-1923. SLIDING DOOR FLUSH HANDLE LOCK AND KEEPER. A. & W.

FIGS. 1924-1925. FLUSH SLIDING DOOR MORTISE LATCH AND KEEPER FOR ROUND EDGE DOOR. A. & W.



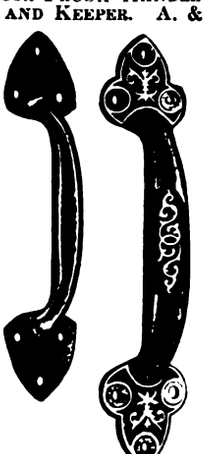
FIGS. 1926-1929. BAGGAGE CAR DOOR LOCK, KEEPER, KEY AND ESCUTCHEON. D. M. CO.

FIGS. 1930-1931. SLIDING DOOR FLUSH HANDLE LOCK AND KEEPER. A. & W.

FIGS. 1932-1934. SLIDING DOOR FLUSH HANDLE LOCK AND KEEPER. A. & W.

FIG. 1935. FLUSH DOOR HANDLE. A. & W.

FIG. 1936. SLIDING DOOR HANDLE. D. M. CO.



FIGS. 1937-1938. SALOON DOOR HANDLES. (193) A. & W.

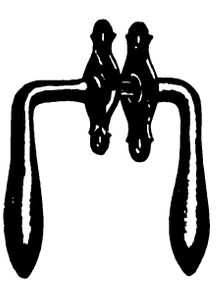


FIG. 1939. DOOR HANDLES FOR SLIDING DOORS. D. M. CO.

FIG. 1940.

FIG. 1941. DOOR CHAIN BOLT.

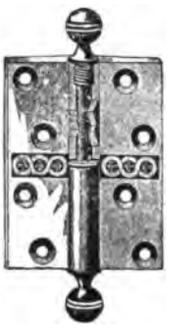


FIG. 1942.
ACORN BUTT HINGE.
D. M. CO.

FIGS. 1943-1945.
LOOSE PIN REVERSIBLE BUTT HINGE.

FIG. 1946.
PARLIAMENT HINGE.

FIG. 1947.
A. & W.
LOOSE JOINT ACORN BUTT HINGES WITH WASHER.

FIG. 1948.
D. M. CO.

FIG. 1949.
LOOSE PIN BUTT HINGE WITH BALL BEARING WASHER.

FIG. 1950.
WASHER COMPLETE.

FIG. 1951.
WASHER BASE.

FIG. 1952.
BALL GUIDE.

FIGS. 1953-1955.
LOOSE PIN BUTT HINGE.

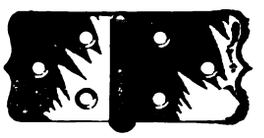


FIG. 1956. HOPPER BUTT HINGE.

FIG. 1957.
TABLE HINGE. A. & W.

FIG. 1958. A. & W.

FIG. 1959. D. M. CO.

FIG. 1960. T-HINGE.

VESTIBULE DOOR HINGES COVERED WITH BRASS.

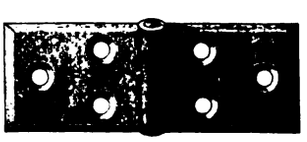


FIG. 1961. BUTT HINGE RIVETED JOINT.

FIG. 1962. OFFSET RIVETED JOINT BUTT HINGE.

FIG. 1963.
POCKET HINGE.

FIG. 1964.
VESTIBULE HINGE FOR RABBETED DOOR.
A. & W.

FIG. 1965. DISTRIBUTING TABLE HINGE FOR POSTAL CARS. D. M. CO.

FIGS. 1966-1967.
LAMP HOUSE HINGES. D. M. CO.

FIG. 1968. REFRIGERATOR DOOR HINGE. D. M. CO.

FIG. 1969.
LAMP HOUSE HINGE.
D. M. CO.

FIG. 1970. STEP LADDER HINGE. A. & W.

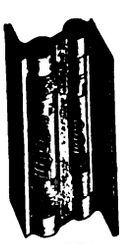


FIG. 1971.
DOUBLE ACTING SPRING HINGE.
D. M. CO.

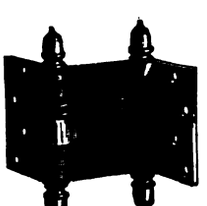
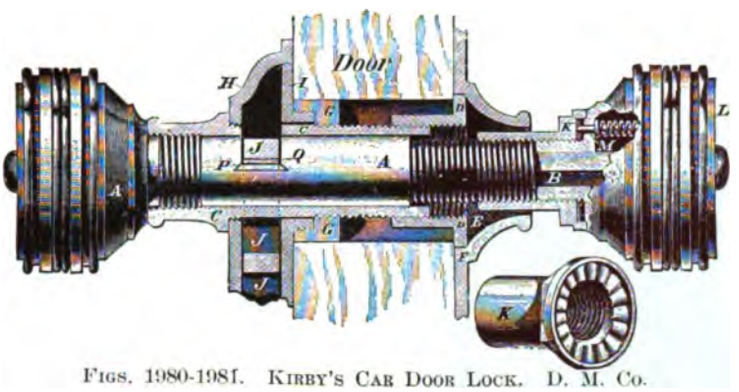


FIG. 1972. DOUBLE ACTING SPRING HINGE. A. & W.

Fig. 1973. Fig. 1974. Fig. 1975. Fig. 1976. Fig. 1977. Fig. 1978. Fig. 1979.
Key Hole Escutcheons. A. & W.



Figs. 1980-1981. Kirby's Car Door Lock. D. M. Co.

Names of Parts of Car Door Lock. Figs. 1980-1981.

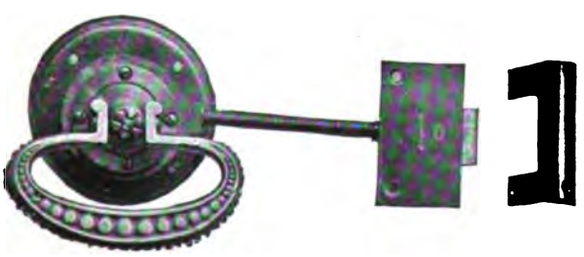
A. *Inside Door Knob*	E. and F. *Door Latch Rose*	K. *Coupling Sleeve*
A'. *Shank*	G. *Lock Nut*	L. *Outside Knob*
B. *Spindle*	H. *Inside Shell*	M. *Ratchet Bolt*
C. *Sleeve*	I. *Back Plate*	P. *Shank Facing*
D. *Outside Sleeve Collar*	J. *Latch Pull*	Q. *Latch Bolt Facing*

Fig. 1982. Door Handle Escutcheon Plate and Rose. A. & W.

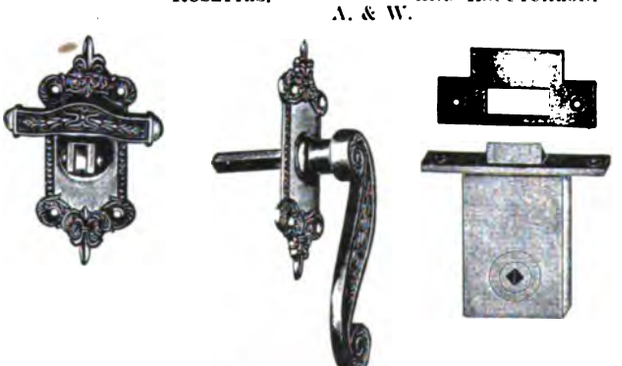
Fig. 1983. Fig. 1984. Fig. 1985.
Door Knobs, Spindles and Roses. A. & W.

Figs. 1986-1987.
Door Knobs and Rosettes.

Fig. 1988.
Flush Door Handle and Escutcheon.
A. & W.



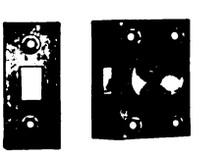
Figs. 1989-1990. Vestibule Door Latch and Keeper.
A. & W.



Figs. 1991-1994. Platform Vestibule Door Latch Handles and Keeper. A. & W.

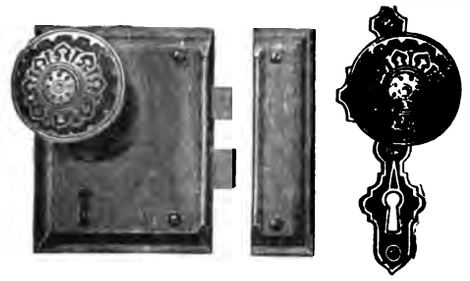
Fig. 1995.
Baggage Car Door Latch.
A. & W.

Figs. 1996-1997.
Cabin Door Hook and Button. A. & W.



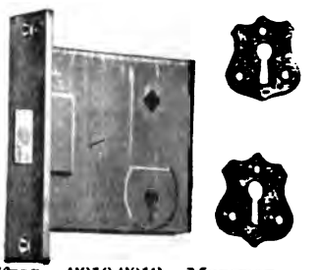
Figs. 1998-1999.
Cupboard Catch.
A. & W.

Figs. 2000-2002.
Door Dead Lock with Slide Bolt.
A. & W.

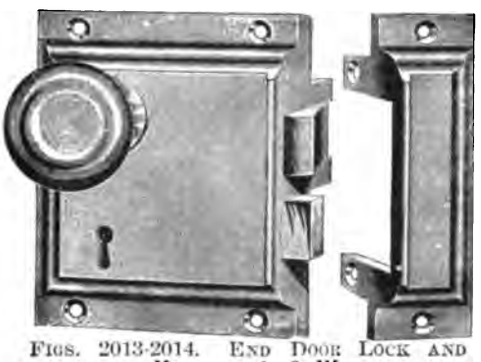


FIGS. 2003-2005. END DOOR LOCK, KEEPER, ROSE AND ESCUTCHEON. A. & W.

FIGS. 2006-2009. PARTITION DOOR LOCK, KEEPER, KNOBS AND ESCUTCHEON. A. & W.



FIGS. 2010-2012. MORTISE DOOR LOCK AND ESCUTCHEONS. A. & W.

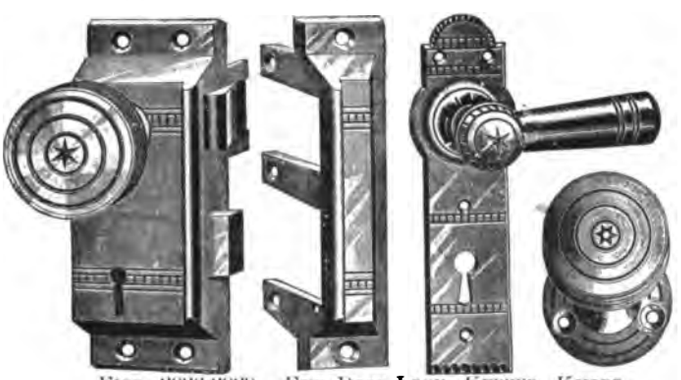


FIGS. 2013-2014. END DOOR LOCK AND KEEPER. A. & W.

FIGS. 2015-2018. END DOOR LOCK, KEEPER, KNOB AND ESCUTCHEON. A. & W.

FIGS. 2019-2022. END DOOR LOCK, KEEPER, ROSE AND ESCUTCHEON. A. & W.

FIGS. 2023-2025. END DOOR LOCK, KEEPER AND ROSE. A. & W.

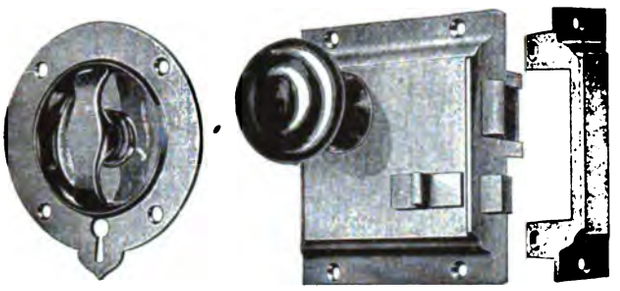


FIGS. 2026-2029. END DOOR LOCK, KEEPER, KNOBS, ESCUTCHEON AND ROSE. A. & W.

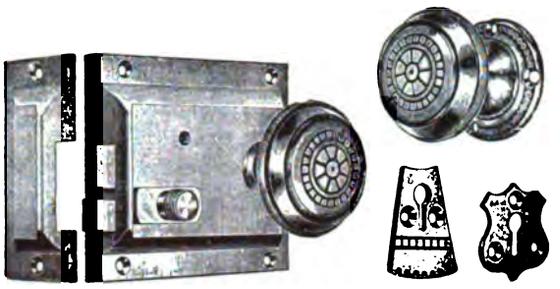
FIGS. 2030-2032. COMBINED END DOOR LOCK AND NIGHT LATCH, KEEPER AND ESCUTCHEON PLATE. A. & W.

FIGS. 2033-2036.
END DOOR LOCK, KEEPER, ESCUTCHEON PLATE AND THUMB LATCH. A. & W.

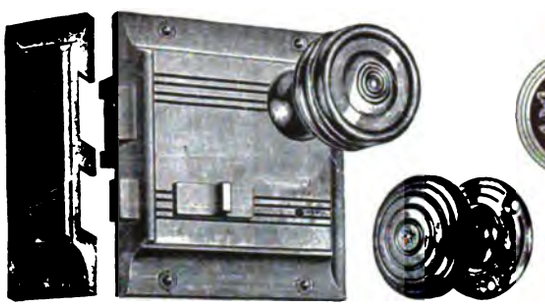
FIGS. 2037-2039.
COMBINED END DOOR LOCK AND NIGHT LATCH, KEEPER AND ESCUTCHEON. A. & W.



Figs. 2040-2042. Saloon Door Lock, Keeper and Flush Handle. A. & W.



Figs. 2043-2047. Saloon Door Lock, Keeper, Knobs and Escutcheons. A. & W.

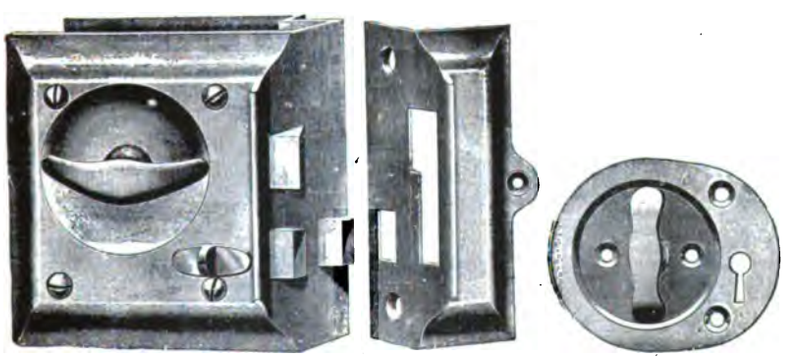


Figs. 2048-2050. Saloon Door Lock, Keeper and Knob. A. & W.

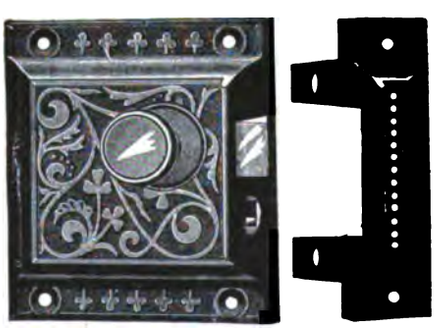
Figs. 2051-2053. Saloon Door Lock, Keeper and Flush Handle. A. & W.

Figs. 2054-2055. Saloon Door Lock, Keeper and Extra Bolt. A. & W.

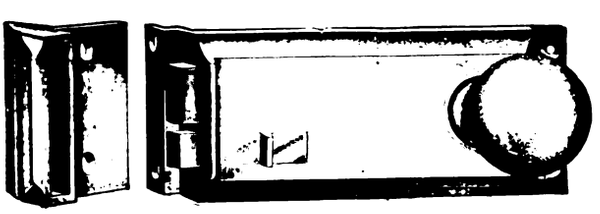
Figs. 2056-2058. Saloon Door Lock, Keeper and Knob. A. & W.



Figs. 2059-2061. Saloon Door Lock, Keeper and Flush Handle. A. & W.



Figs. 2062-2063. End Door Night Latch and Keeper. A. & W.



Figs. 2064-2065. Extra Long Saloon Door Lock and Keeper. A. & W.

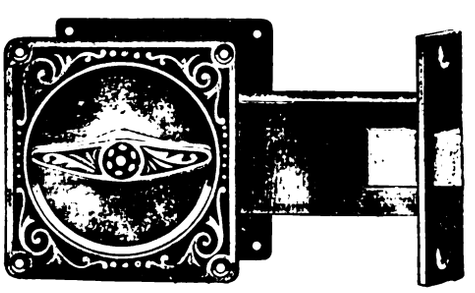
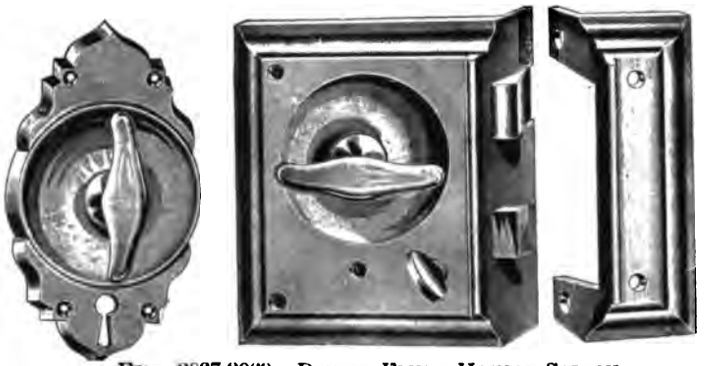
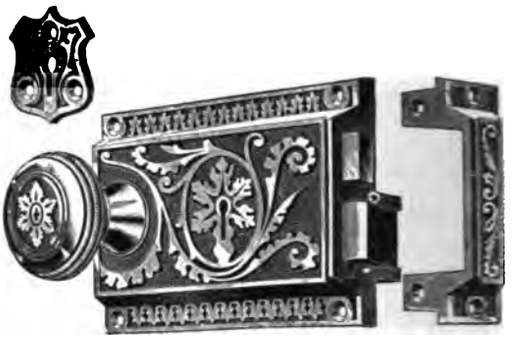


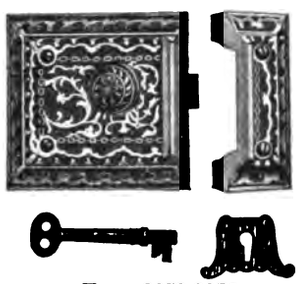
Fig. 2066. Vestibule Door Mortise Latch. A. & W.



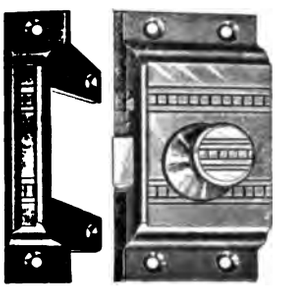
Figs. 2067-2069. Double Flush Handle Saloon Door Lock and Keeper. A. & W.



Figs. 2070-2072. End Door Lock Keeper and Escutcheon. A. & W.

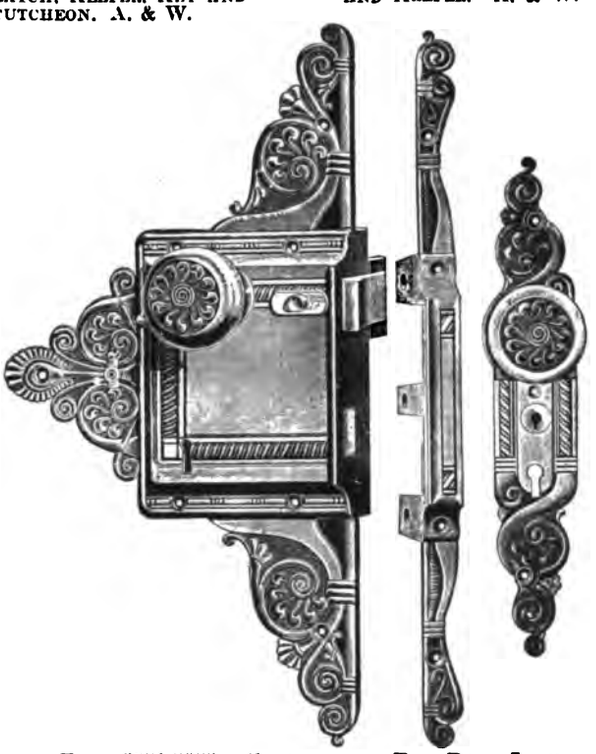


Figs. 2073-2076. Night Latch, Keeper, Key and Escutcheon. A. & W.

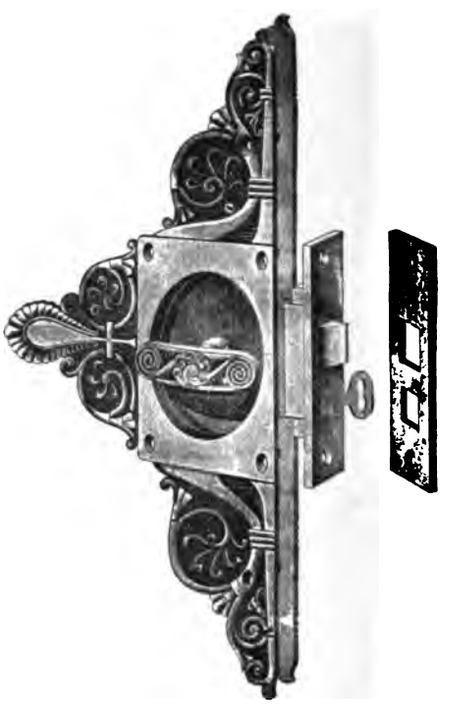


Figs. 2077-2078. Night Latch and Keeper. A. & W.

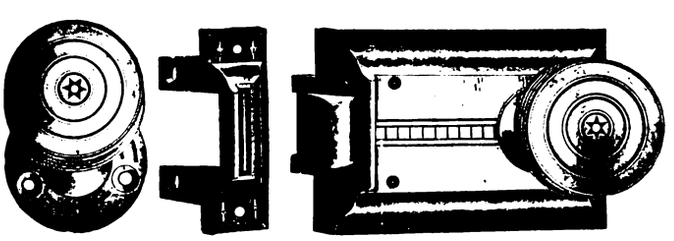
Figs. 2079-2080. Partition Door Latch and Keeper. A. & W.



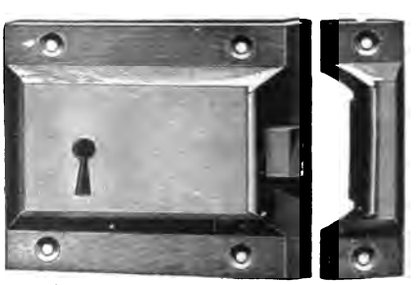
Figs. 2081-2083. Combination End Door Lock and Night Latch. A. & W.



Figs. 2084-2085. Double Flush Handle Saloon Door Lock. A. & W.



Figs. 2086-2088. Saloon Door Latch, Keeper Knob and Rose. A. & W.



Figs. 2089-2090. Dead Lock with Keeper. A. & W.

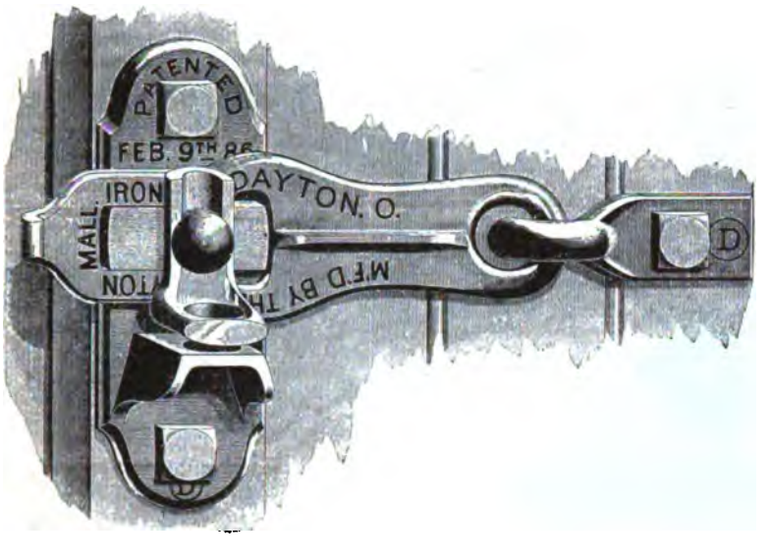


Fig. 2091. Lock Closed, Ready for Pin or Seal.

Fig. 2092. Lock in Position to Release Hasp.

Dayton Freight Door Lock. Malleable Iron.

Dayton Malleable Iron Co., Maker.

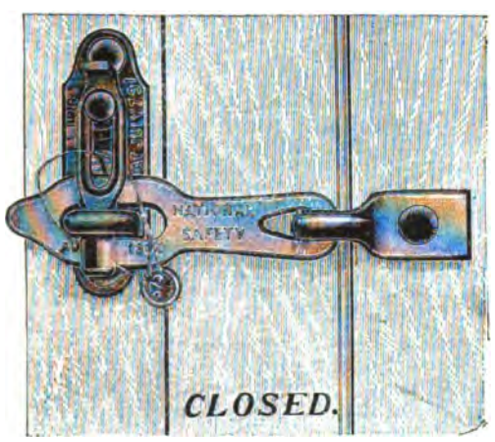


Fig. 2093. National Safety Freight Door Lock.

Fig. 2094. Hasp No. 16.

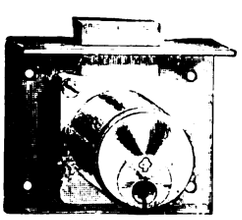
Fig. 2095. Staple, No. 15.

Fig. 2096. Staple Plate with Seal Pin Attached. No. 186.

The National Malleable Castings Co., Maker.

Figs. 2097-2100. Yale Night Latch, Keeper, Keys and Escutcheon.

Figs. 2101-2102. Yale Padlock and Keys.



Figs. 2103-2104. Yale Cabinet Lock and Keys.

Fig. 2105. Master Key

Figs. 2106-2107. Yale Cabinet Locks and Keys.

FIG. 2108. A. & W.
SIZE, 2⅝ x 10½ INS.

FIG. 2109. A. & W.
SIZE, 4 x 12⅞ INS.

FIG. 2110. A. & W.
SIZE, 4 x 13¾ INS.

FIG. 2111. A. & W.
SIZE, 3 5/16 x 12 INS.

FIG. 2112. A. & W.
SIZE, 3¾ x 11⅝ INS.

FIG. 2113. A. & W.
SIZE, 3⅞ x 11⅝ INS.

FIG. 2114. A. & W.
SIZE, 3⅜ x 12⅞ INS.

FIG. 2115. A. & W.
SIZE, 5 x 14⅝ INS.

FIG. 2116. A. & W.
SIZE, 5¼ x 12⅞ INS.

FIG. 2117. A. & W.
SIZE, 4 x 9¾ INS.

FIG. 2118. D. M. Co.
SIZE, 2⅜ x 11 INS.

FIG. 2119. D. M. Co.
SIZE, 2⅜ x 8⅝ INS.

FIG. 2120. D. M. Co.
SIZE, 2⅜ x 9 INS.

PLATFORM NOTICE PLATES.

FIG. 2121. A. & W.
SIZE, 2 x 7½ INS.

FIG. 2122. A. & W.
SIZE, 2 x 6½ INS.

FIG. 2123. A. & W.
SIZE, 3 x 14½ INS.

FIG. 2124. A. & W.
SIZE, 3 x 14½ INS.

DOOR NOTICE PLATES.

Fig. 2125. D. M. Co.
Size, 2 x 5⅞ ins.

Fig. 2126. D. M. Co.
Size, 2 x 4⅝ ins.

Fig. 2127. D. M. Co.
Size, 2 x 7½ ins.

Fig. 2128. D. M. Co.
Size, 2 x 2 ins.

Fig. 2129. A. & W.
Size, 1½ x 9 ins.

Fig. 2130. A. & W.
Size, 1½ x 9 ins.

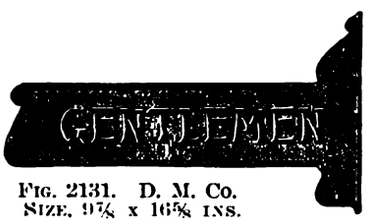


Fig. 2131. D. M. Co.
Size, 9⅞ x 16⅝ ins.

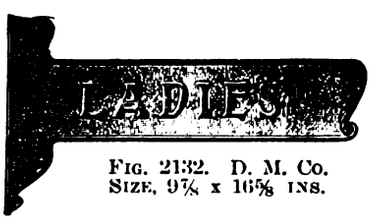


Fig. 2132. D. M. Co.
Size, 9⅞ x 16⅝ ins.

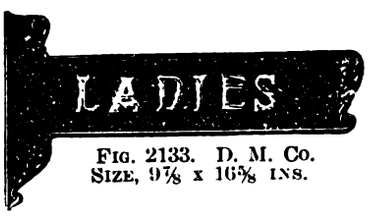
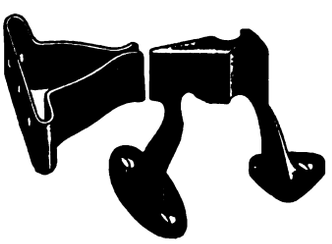
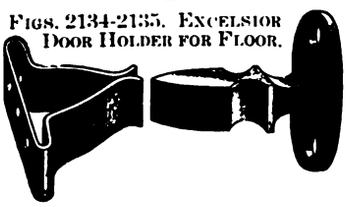


Fig. 2133. D. M. Co.
Size, 9⅞ x 16⅝ ins.

Door Notice Plates.



Figs. 2134-2135. Excelsior Door Holder for Floor.



Figs. 2136-2137. Excelsior Door Holder for Partition.

Figs. 2138-2139. Door Holder.

Figs. 2140-2141. Door Holder.

Figs. 2142-2143. Door Holder for Sliding Door.

Figs. 2144-2145. Door Holder.

Door Holders and Stops. A. & W.

Fig. 2146. Gem Door Spring.

Fig. 2147. Bee Door Spring.

Fig. 2148. Blount Door Check.
Yale & Towne Mfg. Co., Makers.

Fig. 2149.

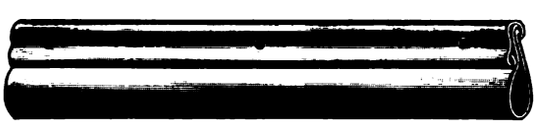


Fig. 2150.

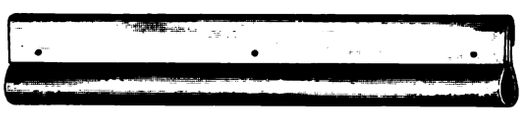


Fig. 2151.

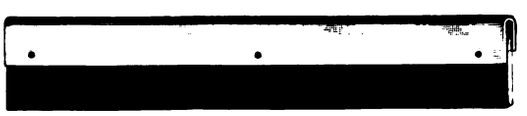


Fig. 2152.
Weather Strips. D. W. Boseley Co.

FIG. 2153.

FIG. 2154.

FIG. 2155.
CAR DOOR SHEAVES. D. M. CO.

FIG. 2156.

FIG. 2157. SLIDING DOOR SHEAVE. A. & W.

FIG. 2158. A. & W

FIG. 2159. D. M. CO.

FIG. 2160.
D. M. Co.

BAGGAGE AND END DOOR SHEAVES.

FIG. 2161. BOTTOM DOOR ROLLER. D. M. CO.

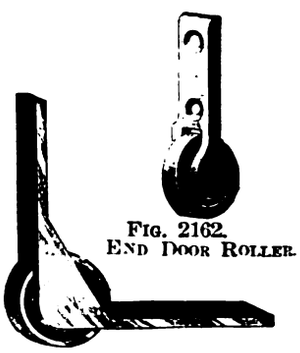


FIG. 2162.
END DOOR ROLLER.

FIG. 2163. BOTTOM DOOR ROLLER. D. M. Co.

FIG. 2164.
CORNER DOOR ROLLER. D. M. Co.

FIG. 2165.
BOTTOM DOOR ROLLER. D. M. Co.

FIG. 2166. CORNER DOOR ROLLER. D. M. Co.

FIG. 2167. CARPET EYELETS AND NAILS. D. M. Co.

FIGS. 2168-2169. UPPER AND LOWER GROMETS FOR CARPET EYELETS. A. & W.

FIG. 2170.
WIRE EYELET NAIL. A. & W.

FIGS. 2171-2172. SPITTOON. D. M. Co.

FIG. 2173.
CAST SPITTOON.

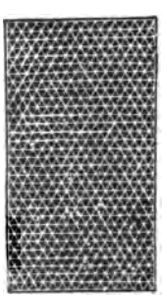


FIG. 2174.
CORRUGATED RUBBER FLOOR MAT.

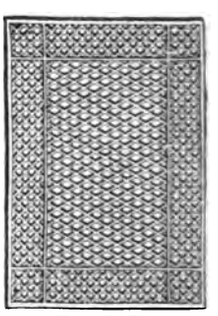


FIG. 2175.
PERFORATED RUBBER FLOOR MAT.

FIG. 2176.
CUSPIDOR. D. M. Co.

FIG. 2177.
SPITTOON. D. M. Co.

FIG. 2178.

FIG. 2179.
PROTECTION CUSPIDOR WITH MAT.

FIG. 2180. SECTIONAL VIEW.

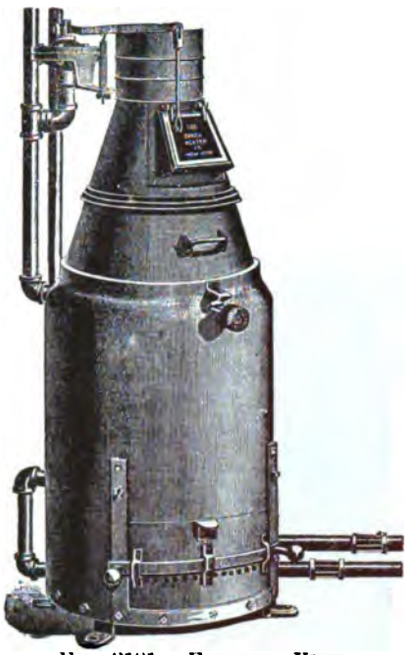


FIG. 2181. EXTERIOR VIEW.

THE "FIRE PROOF" HEATER.

FIG. 2182.
AUTOMATIC FIRE REGULATOR AND PRESSURE INDICATOR COMBINED.

FIG. 2183.
DRAFT DOOR AND FRAME.

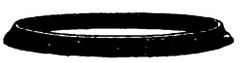


FIG. 2184.
RING FOR RUSSIA IRON.

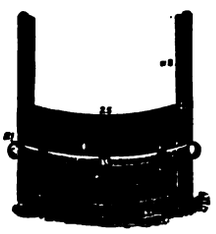


FIG. 2186. ASH PIT DOOR FRAME.

FIG. 2187.
REMOVABLE ASH PAN.

FIG. 2188. FEED DOOR.

FIG. 2185.
COAL FEED CHUTE.

FIG. 2189.
GENERATOR COIL OF 30 FEET OF CONTINUOUS EXTRA HEAVY WROUGHT IRON PIPE.

FIG. 2190. ASH PIT.

FIG. 2191.
REGULATOR DIAPHRAGM.

FIG. 2192. CAST IRON SMOKE SCREEN.

FIG. 2193. ASH PIT RING.

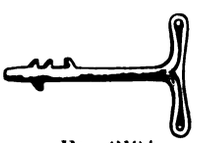


FIG. 2194.
GRATE SHAKER.

FIG. 2195.
FIRE GRATE.

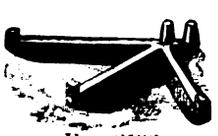


FIG. 2196.
FIRE GRATE SUPPORT.

FIG. 2197.
SAFETY PLATE AND WOODEN HANDLE.

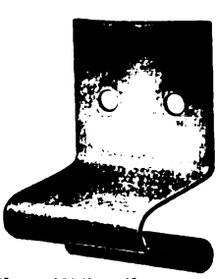


FIG. 2198. SAFETY PLATE SPRING.

FIG. 2199. BASE OF SMOKE FLUE.

FIG. 2200.
SMOKE FLUE BASE.

FIG. 2203. SECTIONAL VIEW.

FIG. 2204. EXTERIOR VIEW.
BAKER'S IMPROVED TWO-COIL FIRE PROOF HEATER.

FIG. 2201. FIRE POT.

FIG. 2202. ASH PIT RING.

FIG. 2205. ASH PIT.

FIG. 2206.
SAFETY PLATE
SPRING.

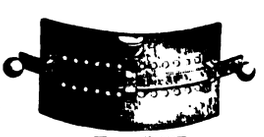


FIG. 2207.
ASH PIT DOOR.

FIG. 2208.
CIRCULATING DRUM.

FIG. 2209.
FIRE GRATE.

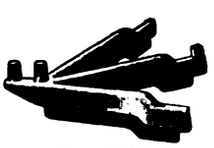


FIG. 2210.
FIRE GRATE
SUPPORT.

FIG. 2211.
DRAFT DOOR
AND FRAME.

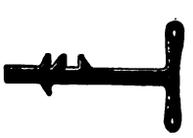


FIG. 2212.
GRATE SHAKER.

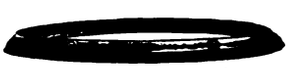


FIG. 2213. RING FOR
RUSSIA IRON TOP.

FIG. 2214.
DOUBLE EXPANDING
GENERATOR COIL.

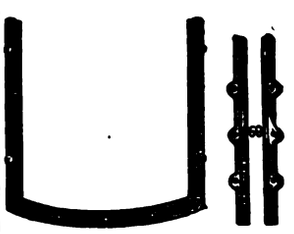


FIG. 2215.
ASH PIT
DOOR FRAME.

FIG. 2216.
SAFETY PLATE
GUIDES.

FIG. 2217.
FEED DOOR.

FIG. 2218.
SMOKE SCREEN.

FIG. 2219. SAFETY PLATE
AND HANDLE.

FIG. 2220.
REMOVABLE
ASH PAN.

BAKER'S TWO-COIL FIRE PROOF HEATER AND PARTS SPECIALLY BELONGING TO IT.

FIG. 2221. THE "PERFECTED" HEATER.

FIG. 2222. UPRIGHT CIRCULATING DRUM.

FIG. 2223. RING FOR RUSSIA IRON TOP.

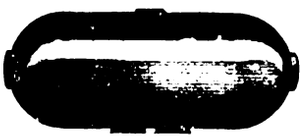


FIG. 2224. CIRCULATING DRUM AND EXPANSION CHAMBER.

FIG. 2225. SMOKE FLUE BASE.

FIG. 2226. EXPANDING GENERATOR COIL.

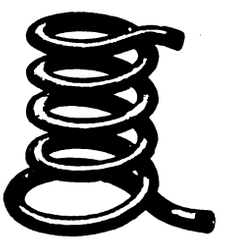


FIG. 2227. GENERATOR COIL.

FIG. 2228. OUTSIDE CASING, REMOVABLE.

FIG. 2229. HIGH FIRE POT.

FIG. 2230. ASH PIT.

FIG. 2231. ASH PIT TOP, GRATE AND DOOR.

FIG. 2232. TOP OF HEATER AND PART OF GAS PREVENTER.

FIG. 2233. ASH PIT BOTTOM AND HEARTH.

FIG. 2234. FEED DOOR.

FIG. 2235. FILLING FUNNEL AND COMBINATION COCK WITH DRIP.

FIG. 2236. SAFETY LATCH.

FIG. 2237. GRATE SHAKER.

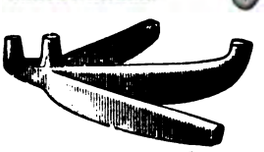


FIG. 2238. GRATE SUPPORT

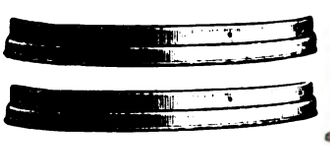
FIG. 2239. INSIDE CASING, REMOVABLE.

BAKER'S "PERFECTED" HEATER AND PARTS ESPECIALLY BELONGING TO IT.

FIG. 2240. SECTIONAL VIEW.

FIG. 2241. CAST IRON SAFETY VENT AND BUSHING.

FIG. 2242. HEATER COIL.



FIGS. 2243-2244. ASH PIT DOOR GUIDES.

FIG. 2245. TOP OF HEATER.

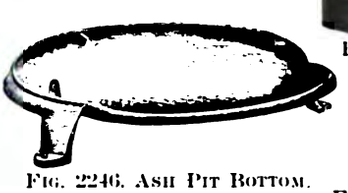


FIG. 2246. ASH PIT BOTTOM.

FIG. 2247. SAFETY PLATE AND GAS PREVENTER COMBINED.

FIG. 2248. ASH PIT DOOR

FIG. 2249. GRATE SUPPORT.

BAKER'S "MIGHTY MIDGET" HEATER AND PARTS BELONGING TO IT.

FIG. 2200.
SMOKE FLUE BASE.

FIG. 2203. SECTIONAL VIEW.

FIG. 2204. EXTERIOR VIEW.

BAKER'S IMPROVED TWO-COIL FIRE PROOF HEATER.

FIG. 2201. FIRE POT.

FIG. 2202. ASH PIT RING.

FIG. 2205. ASH PIT.

FIG. 2206.
SAFETY PLATE
SPRING.

FIG. 2207.
ASH PIT DOOR.

FIG. 2208.
CIRCULATING DRUM.

FIG. 2209.
FIRE GRATE.

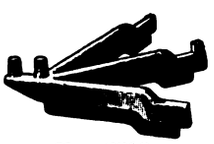


FIG. 2210.
FIRE GRATE
SUPPORT.

FIG. 2211.
DRAFT DOOR
AND FRAME.

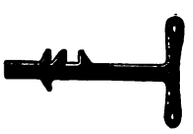


FIG. 2212.
GRATE SHAKER.

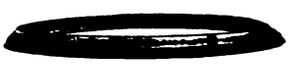


FIG. 2213. RING FOR
RUSSIA IRON TOP.

FIG. 2214.
DOUBLE EXPANDING
GENERATOR COIL.

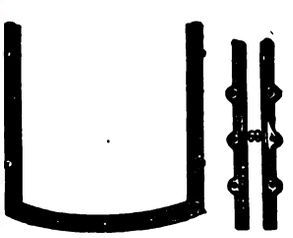


FIG. 2215.
ASH PIT
DOOR FRAME.

FIG. 2216.
SAFETY PLATE
GUIDES.

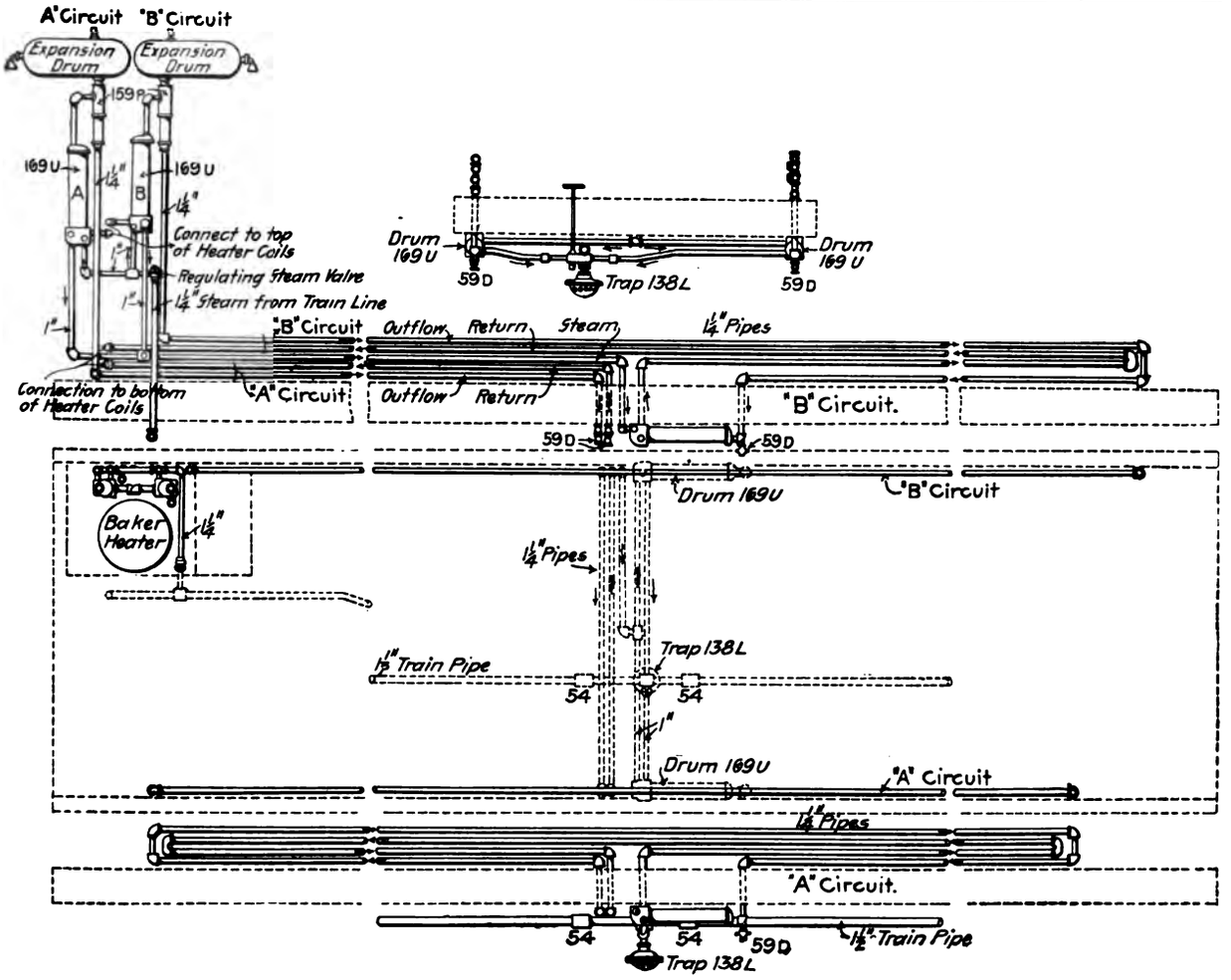
FIG. 2217.
FEED DOOR.

FIG. 2218.
SMOKE SCREEN.

FIG. 2219. SAFETY PLATE
AND HANDLE.

FIG. 2220.
REMOVABLE
ASH PAN.

BAKER'S TWO-COIL FIRE PROOF HEATER AND PARTS SPECIALLY BELONGING TO IT.



FIGS. 2288-2290. PLAN AND ELEVATION OF PIPING SHOWING APPLICATION OF CONSOLIDATED STEAM DRUM NO. 169U TO DOUBLE CIRCUIT.

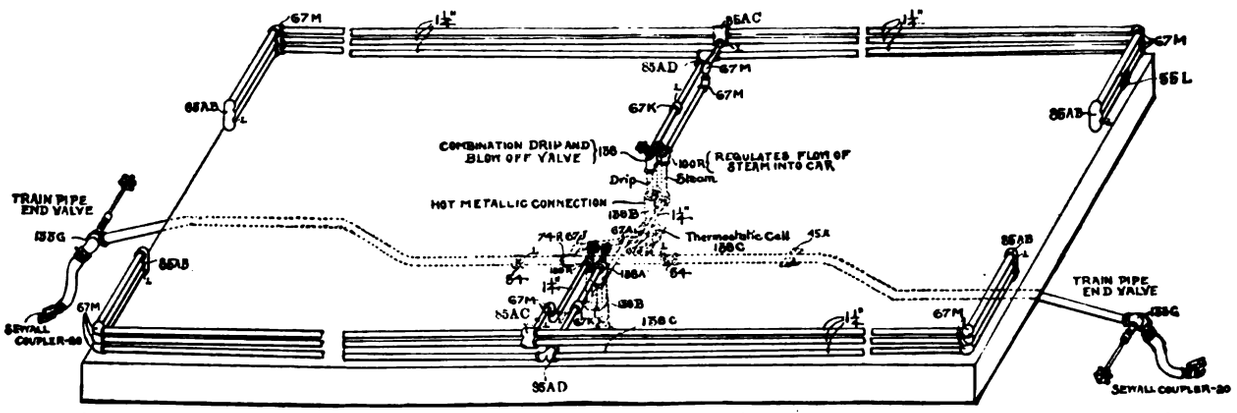


FIG. 2291. PLAN OF PIPING, DIRECT STEAM SYSTEM C, SHOWING 3-PIPE SYSTEM WITH TWO TRAPS, NO. 138 L.

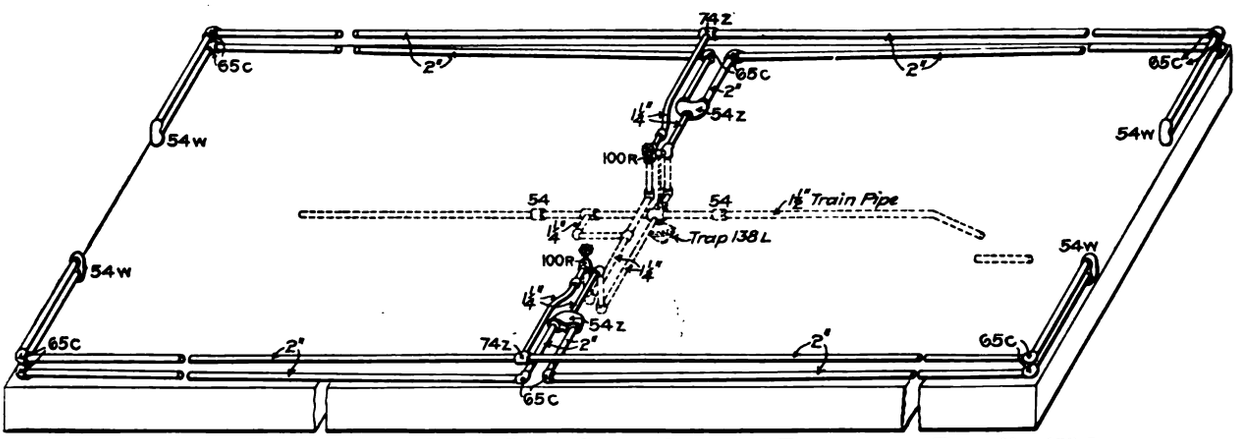


 FIG. 2292. PLAN OF PIPING, DIRECT STEAM SYSTEM B, WITH 1 THERMOSTATIC TRAP, NO. 138 L.

FIG. 2250. OUTSIDE CASE MIGHTY MIDGET HEATER.

FIG. 2251. ASH PIT. MIGHTY MIDGET HEATER.

FIG. 2252. FIRE POT.

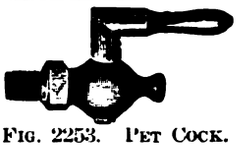


FIG. 2253. PET COCK.

FIG. 2258. SPECIAL WROUGHT IRON PIPE. 2¼ TO 3 LBS. PER FOOT.

FIG. 2254. SAFETY LATCH.

FIG. 2255. FOUR PIPE STRAP.

FIG. 2256. BACK FOR FOUR-PIPE STRAP.

FIG. 2257. RING FOR RUSSIA TOP, MIGHTY MIDGET.

FIG. 2259. TWO PIPE STRAP AND BACK.

FIG. 2260. SAFETY VALVE.

FIG. 2261. BALL FOR SAFETY VALVE.

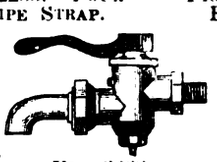


FIG. 2262. COMBINATION COCK.

FIG. 2263. DRUM COVER.

FIG. 2264. PLUG.

FIG. 2265. SINGLE PIPE STRAP.

FIG. 2266. STAND FOR OPEN RETURN BEND RADIATOR.

FIG. 2267. RADIATOR STAND.

FIG. 2268. PIPE AND RADIATOR SUPPORT.

FIG. 2269. FILLING FUNNEL.

FIG. 2270. RETURN BEND.

FIG. 2271. COUPLING

FIG. 2272. REDUCING COUPLING.

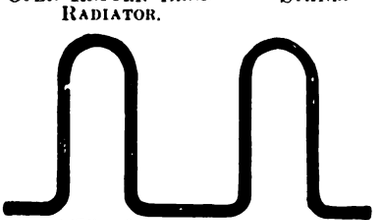


FIG. 2273. DOUBLE RADIATOR TO GO UNDER SEATS.

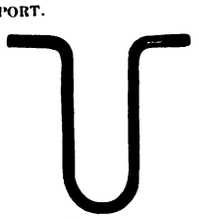


FIG. 2274. RADIATOR TO GO UNDER SEATS.

FIG. 2275. RETURN BEND.

FIG. 2276. RETURN BEND.

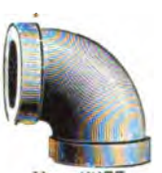


FIG. 2277. ELBOW.

FIG. 2278. STOP COCK.

FIG. 2279. TEE.

FIG. 2280. TEE.

FIG. 2281. ELL WITH OUTLET.

FIG. 2282. NIPPLE.

FIG. 2283. THREE-WAY RETURN BEND.

FIG. 2284. CLOSE NIPPLE.

FIG. 2285. BUSHING.

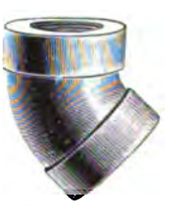


FIG. 2286. 45-DEG. ELBOW.

GENERAL FITTINGS AND SPECIAL PARTS, BAKER'S HEATING APPARATUS.

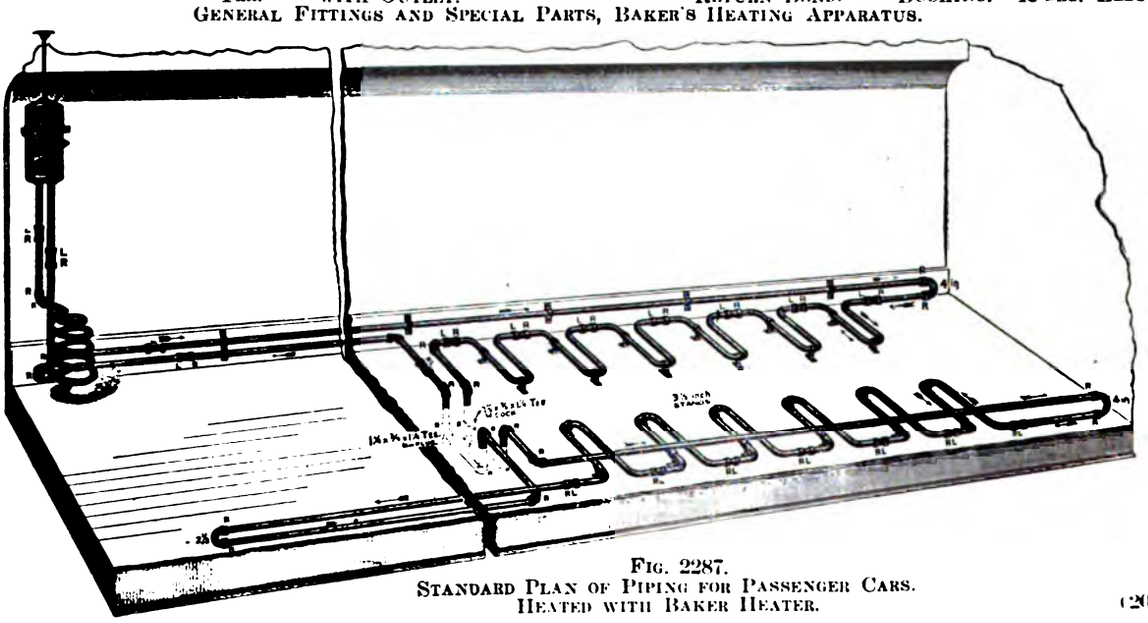
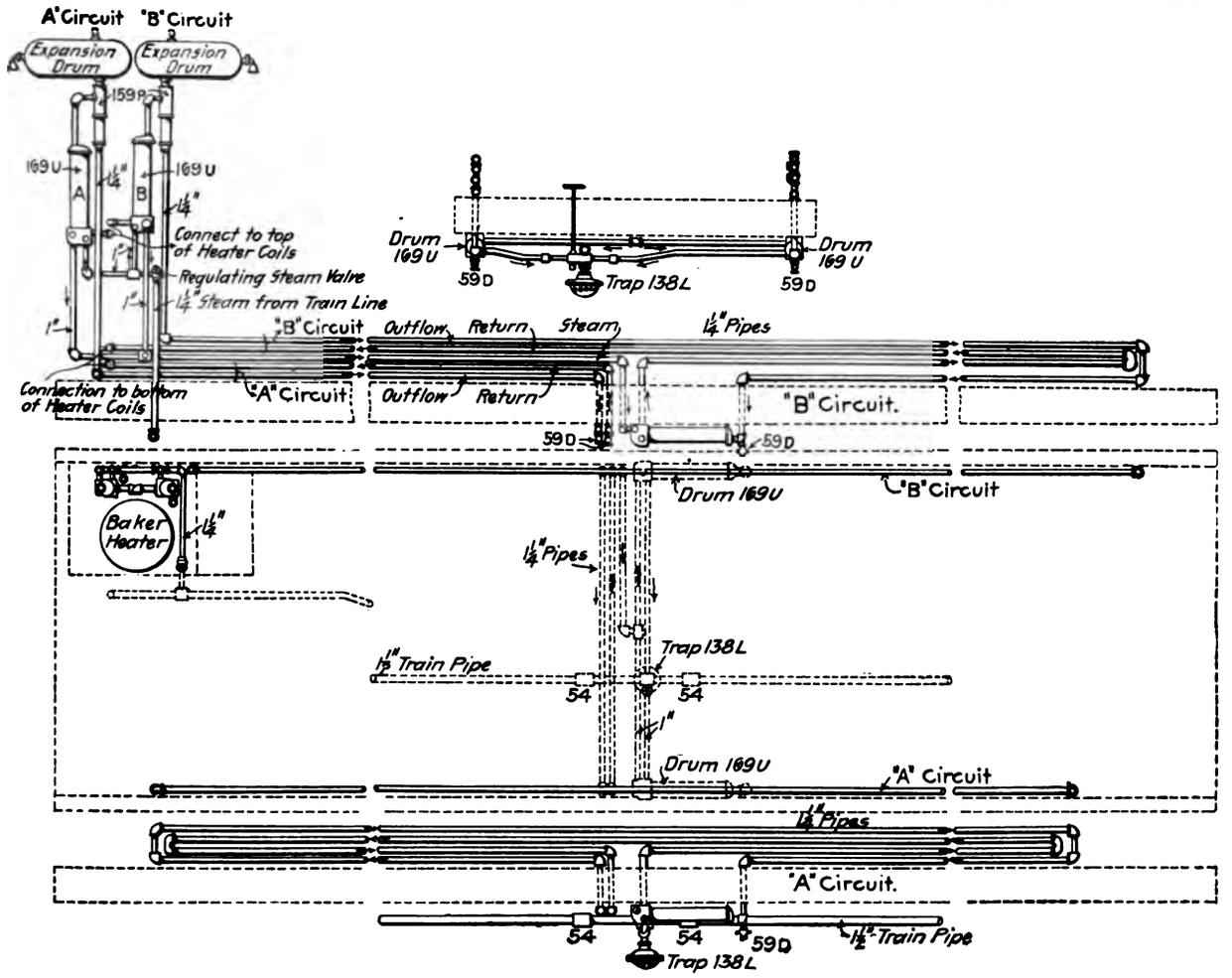


FIG. 2287. STANDARD PLAN OF PIPING FOR PASSENGER CARS. HEATED WITH BAKER HEATER.



FIGS. 2288-2290. PLAN AND ELEVATION OF PIPING SHOWING APPLICATION OF CONSOLIDATED STEAM DRUM NO. 169U TO DOUBLE CIRCUIT.

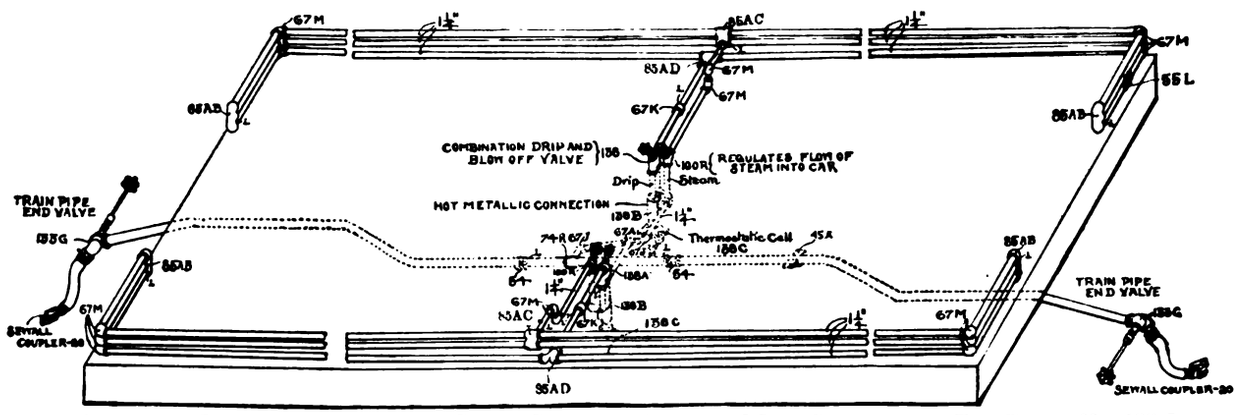


FIG. 2291. PLAN OF PIPING, DIRECT STEAM SYSTEM C, SHOWING 3-PIPE SYSTEM WITH TWO TRAPS, NO. 138 L.

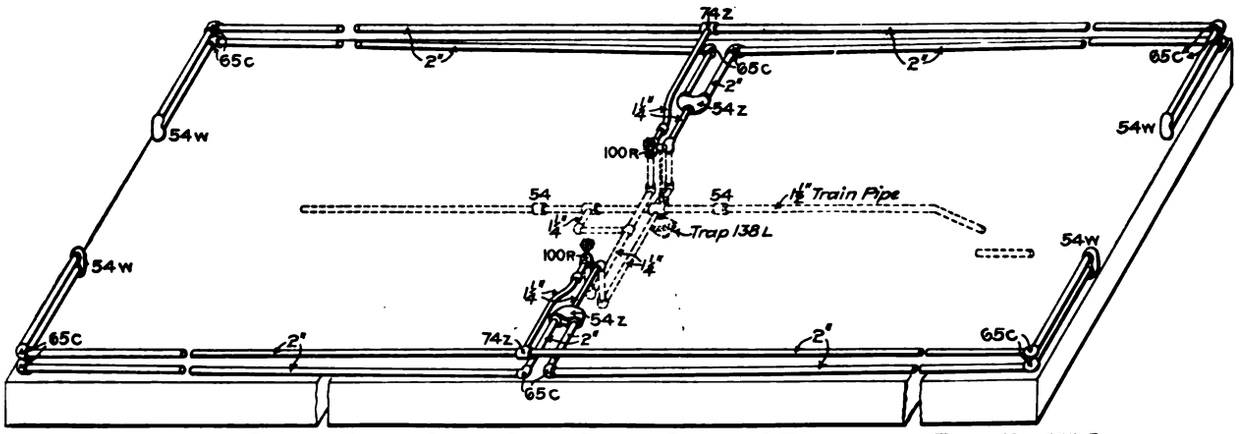


 FIG. 2292. PLAN OF PIPING, DIRECT STEAM SYSTEM B, WITH 1 THERMOSTATIC TRAP, NO. 138 L.

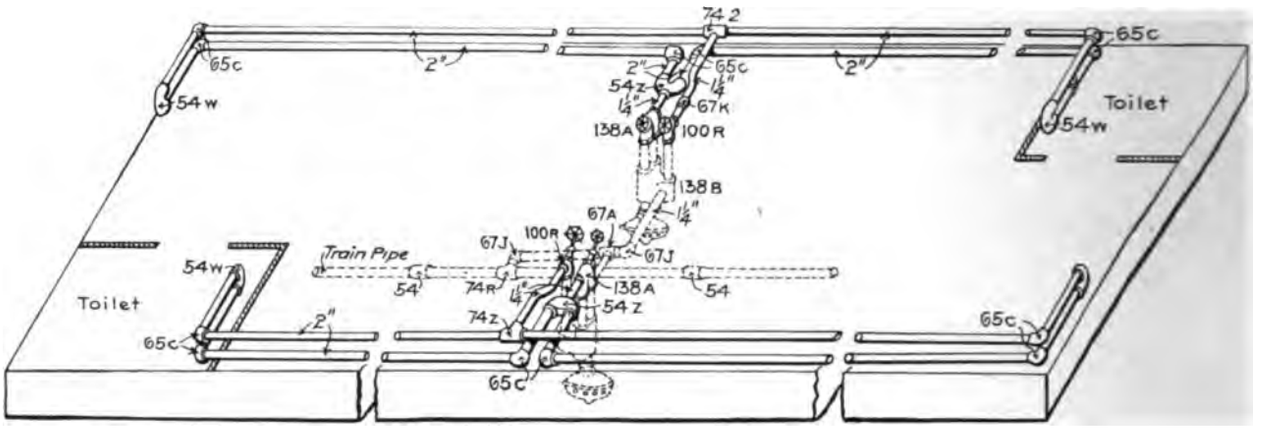


FIG. 2293. PLAN OF PIPING. STANDARD DIRECT STEAM SYSTEM WITH 2 TRAPS. NO. 138.

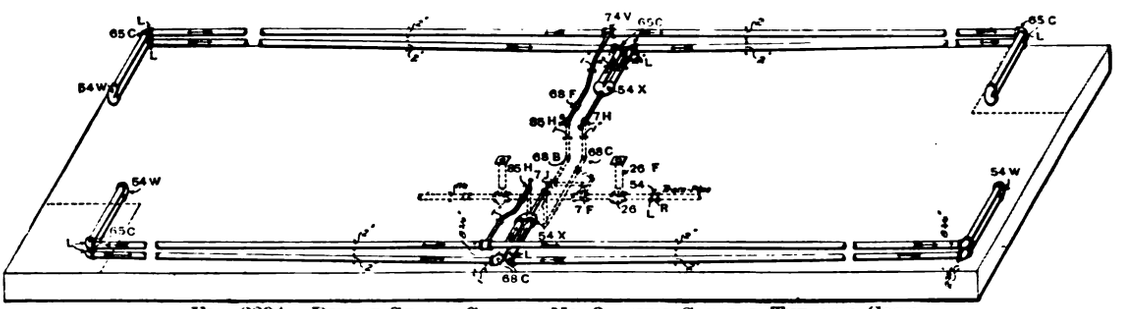


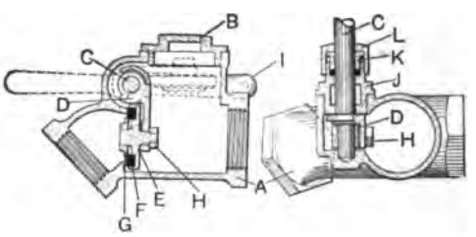
FIG. 2294. DIRECT STEAM SYSTEM NO. 2, WITH SPECIAL TEE AND COCK.

NAMES OF PARTS, FIGS. 2288-2294.

7F. *Tee with Drip Connection*
7H. *Angle Trap Valve*
7J. *Eccentric Tee*
20. *Sewall Coupler*
26. *Asbestos Packed Cock*
26F. *Round Spindle*
26G. *Floor Plate for 26F*
45A. *1½ in. Pipe Clamp*
54. *Coupling R & L*
54W. *Return Bend*
54X. *Return Bend*
54Z. *Return Bend with Eccentric Outlet*
55L. *Expansion Bracket*
65C. *R & L Ell*
67A. *Tee*
67J. *R & L Ell*
67K. *R & L Couplings*
67M. *Ell*
68B. *Ell*
68C. *R & L Ell*
68F. *R & L Coupling*
74R. *Tee*
74V. *Tee*
74Z. *Tee*
85AB. *Three Pipe Manifold*
85AC. *Center Tee*
85AD. *Return Tee*
85H. *Graduating Steam Angle Valve*
100R. *Graduating Steam Valve*
133G. *Train Pipe End Valve*
138. *Steam Trap*
138A. *Steam Trap*
138B. *Steam Trap*
138C. *Steam Trap*
138L. *Steam Trap*

FIG. 2295. GRADUATING VALVE.

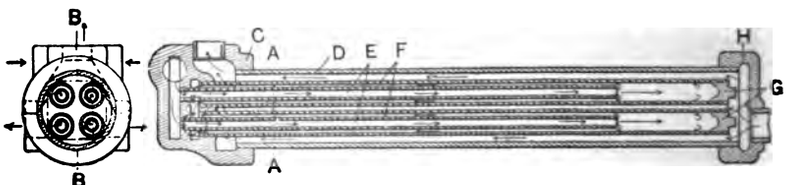
FIG. 2296. TRAP VALVE.



FIGS. 2297-2298. SECTIONS OF END TRAIN PIPE VALVE NO. 133H.

FIG. 2299. END TRAIN PIPE VALVE NO. 133G.

FIG. 2300. TEE WITH DROP CONNECTIONS.



FIGS. 2301-2302. SECTION OF STEAM DRUM NO. 169U.

FIG. 2303. ANGLE COCK.

FIG. 2304. RETURN BEND.

FIG. 2305. STEAM DRUM NO. 169U

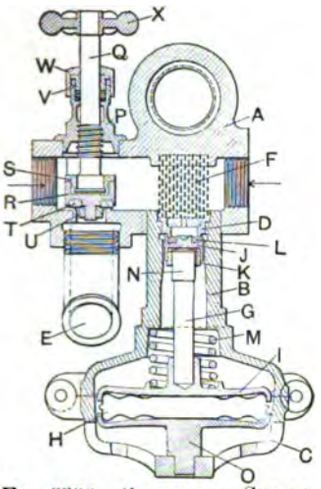


FIG. 2306. SECTION OF STEAM TRAP NO. 138R.

FIG. 2307. STEAM TRAP NO. 138L.

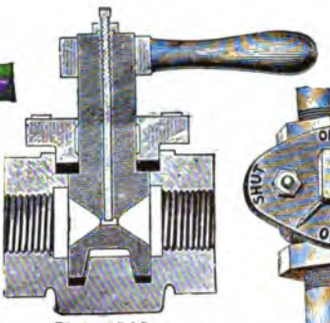


FIG. 2308. SECTION OF TRAP COCK.

FIG. 2309. TRAP COCK.

FIG. 2311. CONSOLIDATED STEAM COUPLER NO. 15.

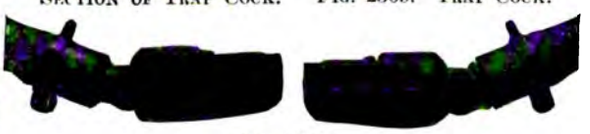


FIG. 2314. CONSOLIDATED COUPLERS NO. 15, UNCOUPLED.

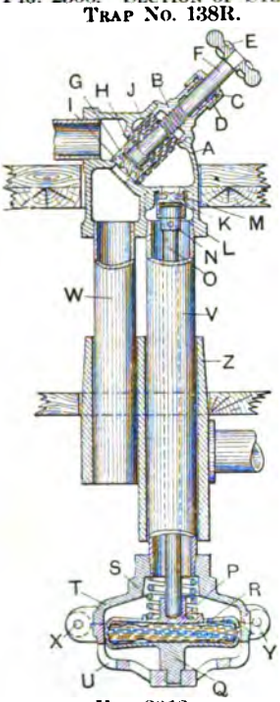


FIG. 2312. SECTION OF STEAM TRAP NO. 138.

FIG. 2310. DIAL COCK.

FIG. 2313. STEAM TRAP NO. 138.

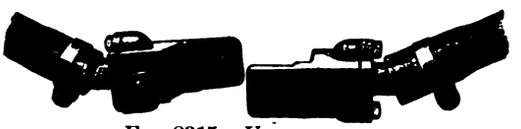


FIG. 2315. UNCOUPLED.

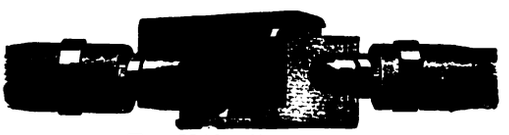


FIG. 2316. COUPLING.

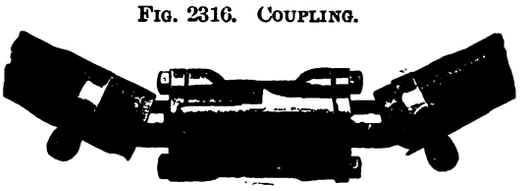


FIG. 2317. COUPLED.

FIG. 2318. TOP VIEW.

FIGS. 2315-2318. SEWALL STEAM HOSE COUPLING.

NAMES OF PARTS. FIGS. 2301-2302.

C. *Head Casting*	169 V
D. *3½ in Iron Pipe*	169 N
E. *1½ in Brass Pipe*	169 R
F. *1 in Brass Pipe*	169 P
G. *Plug for F*	169 L
H. *Cap Casting*	169 K

NAMES OF PARTS. FIG. 2306.

A. *Body Casting*	138 RA
B. *Upper Basket Casting*	138 RB
C. *Lower Basket Casting*	138 CU
D. *Brass Seat for Thermostatic Valve*	138 RC
E. *Curved Nipple for Blow-off*	138 RD
F. *Strainer*	138 LC
G. *Stem or Rod*	138 LD
H. *Diaphragm*	138 CA
I. *Upper Spider Plate*	138 CE
J. *Swivel Head*	138 CJ
K. *Swivel Head Nut*	138 CK
L. *Swivel Head Gasket*	138 CL
M. *Spring*	138 CM
N. *Cap for Valve Stem*	138 CR
O. *Lower Spider Plate*	138 CW
P. *Bonnet*	100 B
Q. *Valve Stem*	100 C
R. *Swivel Head*	100 D
S. *Swivel Head Nut*	100 E
T. *Gasket*	100 G
U. *Nut for T*	100 H
V. *Gland*	100 J
W. *Gland Nut*	100 K
X. *Hand Wheel*	7 R

NAMES OF PARTS. FIGS. 2297-2298.

A. *Body Casting*	133 NA
B. *Cap*	133 NF
C. *Stem*	133 NC
D. *Arm*	133 ND
E. *Swivel Head*	133 NE
F. *Gasket*	133 GK
G. *Gasket Nut*	133 GJ
H. *Swivel Head Nut*	100 H
I. *Handle*	133 NG
J. *Bonnet*	133 NB
K. *Gland*	133 GC
L. *Gland Nut*	133 GD

NAMES OF PARTS. FIG. 2312.

A. *Valve Body*	138 CV
B. *Bonnet*	138 AE
C. *Gland*	138 AG
D. *Gland Nut*	138 AH
E. *Hand Wheel*	7 R
F. *Valve Stem*	138 CY
G. *Swivel Head*	138 CF
H. *Swivel Head Nut*	138 CN
I. *Gasket*	138 CZ
J. *Strainer*	138 CX
K. *Swivel Head*	138 CJ
L. *Swivel Head Nut*	138 CK
M. *Gasket*	138 CL
N. *Cap*	138 CR
O. *Rod or Stem*	138 CH
P. *Upper Spider Plate*	138 CE
Q. *Lower Spider Plate*	138 CG
R. *Diaphragm*	138 CA
S. *Spring*	138 CM
T. *Upper Basket Casting*	138 CS
U. *Lower Basket Casting*	138 CU
V. *1½ in Extra Heavy W I Pipe*	
W. *1¼ in W I Pipe*	
X. *⅜ in R H Rivet for Hinge*	
Y. *⅜ in R H Rivet for Catch*	
Z. *Hot Metallic Steam Connection*	138 B

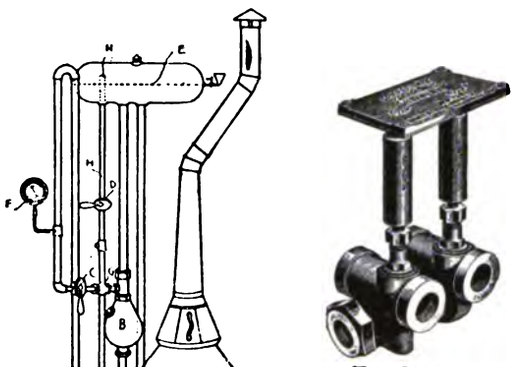


FIG. 2319.
MAIN STEAM CASTING.

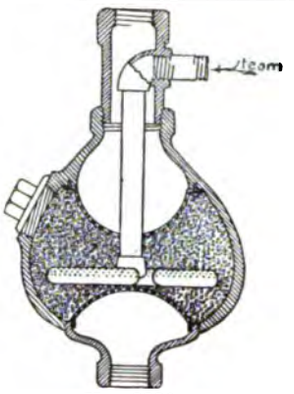


FIG. 2320.
MCELROY COMMINGLER.

FIG. 2321.
SPECIAL ASBESTOS COCK.

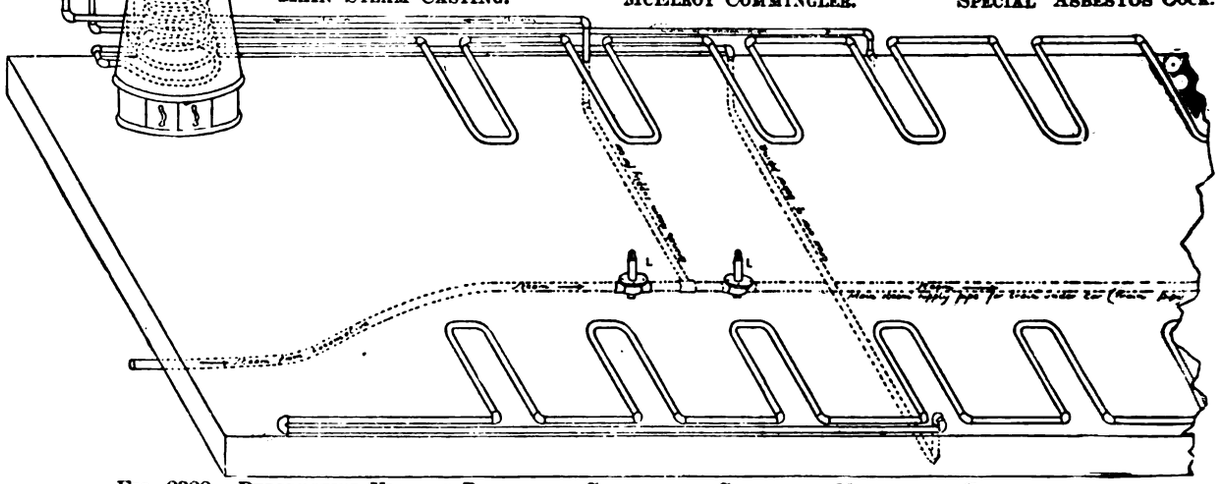


FIG. 2322. PERSPECTIVE VIEW OF PIPING FOR COMMINGLER SYSTEM OF HEATING IN CONNECTION WITH HOT WATER SYSTEM.

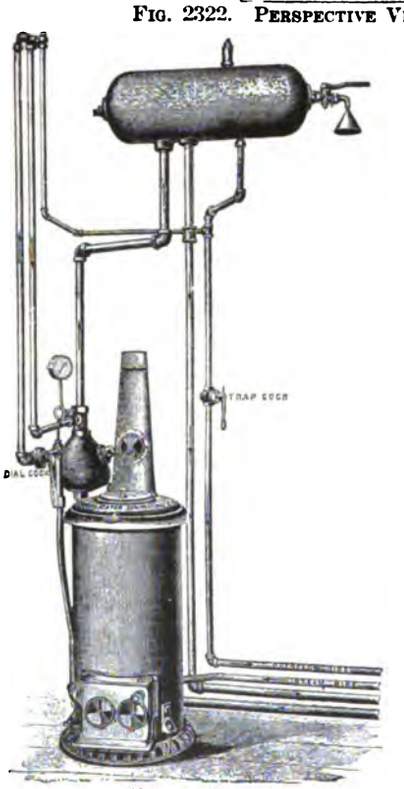


FIG. 2323.
MCELROY COMMINGLER SYSTEM.

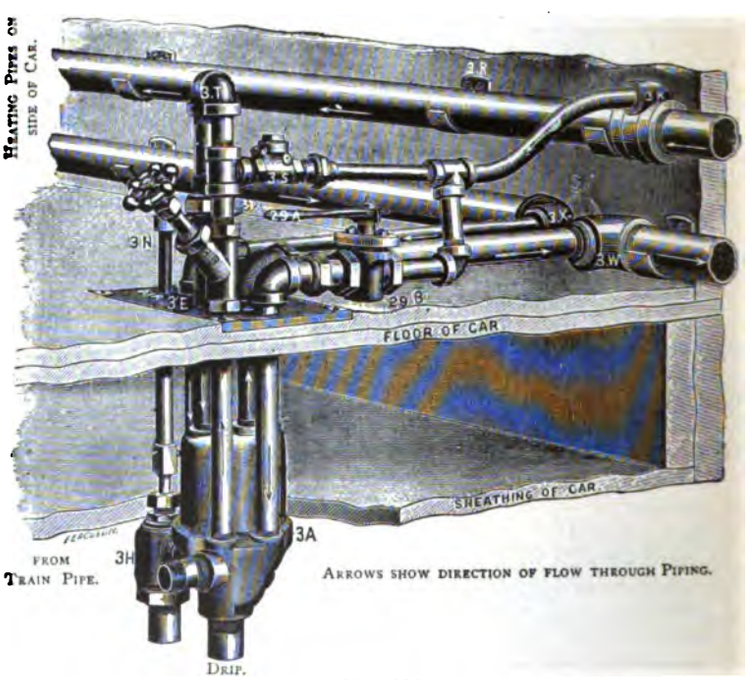


FIG. 2324.
COMMINGLER STORAGE SYSTEM.

NAMES OF PARTS. FIG. 2322.

- **A.** *Coil*
- **B.** *McElroy Commingler*
- **C.** *Dial Cock for Admitting Steam to Commingler B*
- **D.** *Trap for Opening Overflow-Pipe H*
- **E.** *Water Line in Expansion Drum*
- **F.** *Steam Gage to Show Pressure on Train-Pipe*
- **G.** *Swing Check Valve*
- **H.** *Overflow Pipe to Remove Water of Condensation*

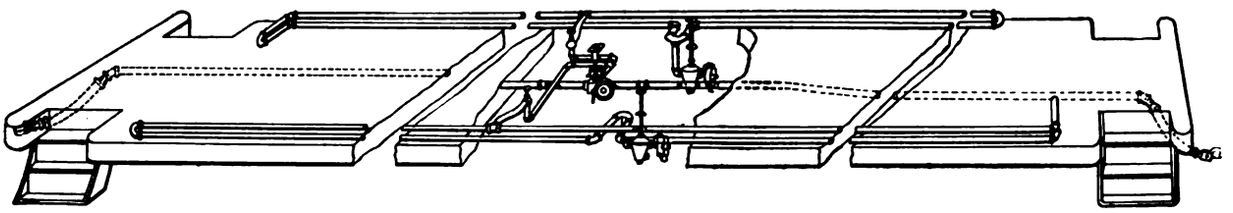


FIG. 2325. PLAN OF CAR SHOWING SYSTEM OF PIPING.
GOLD'S PLAIN PIPE OR DIRECT STEAM SYSTEM OF CAR HEATING.

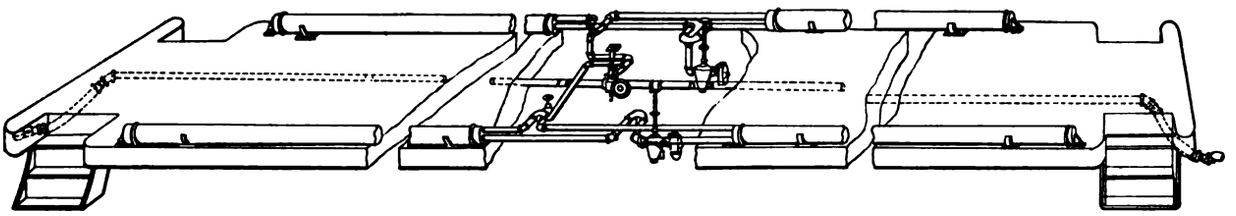


FIG. 2326. PLAN OF CAR SHOWING SYSTEM OF PIPING.
GOLD'S DIRECT STEAM TERRA COTTA STORAGE SYSTEM OF CAR HEATING.

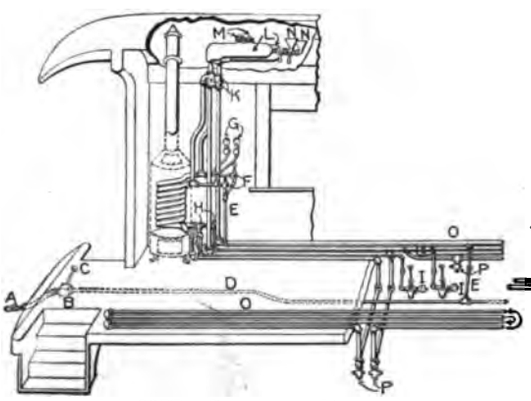


FIG. 2327. SECTIONAL ELEVATION.

GOLD'S DOUBLE COIL (SEALED JET ACCELERATOR) SYSTEM OF CAR HEATING.

NAMES OF PARTS. FIG. 2327.

- A. *Steam Coupler*
- B. *End Train Valve*
- C. *Extension Valve Handle*
- D. *Train Pipe*
- E. *Branch Steam Pipe*
- F. *Steam Supply Valve*
- G. *Steam Pressure Gage*
- H. *Drain Pipes to Trap*
- I. *Steam Traps*
- J. *Duplex Double Coil*
- K. *Sealed Jet Accelerator*
- L. *Expansion Drum*
- M. *Safety Valve*
- N. *Filling Cock*
- O. *Pipe Radiators*
- P. *Draw-off Cock*

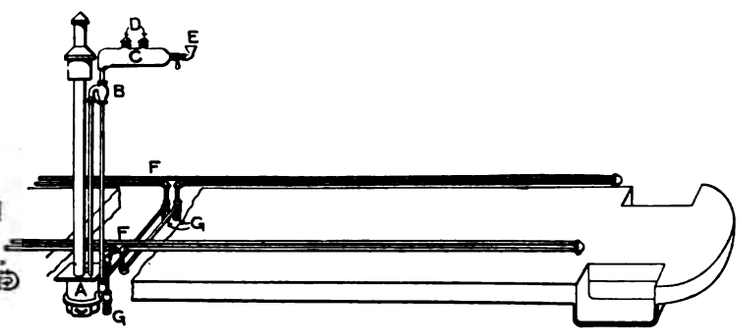
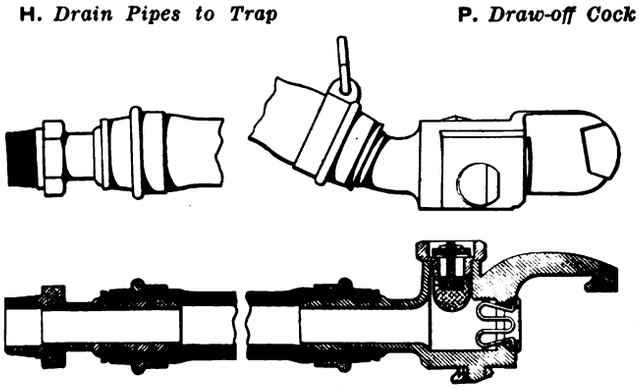


FIG. 2328. ELEVATION.

GOLD'S SYSTEM OF HOT WATER HEATING FOR STREET CARS.

NAMES OF PARTS. FIG. 2328.

- A. *Hot Water Generator*
- B. *Sealed Jet Accelerator*
- C. *Expansion Drum*
- D. *Safety Valve*
- E. *Filling Cock*
- F. *Pipe Radiators*
- G. *Draw-off Cocks*



FIGS. 2329-2331.
GOLD'S UNIVERSAL STRAIGHT-PORT STEAM COUPLER.

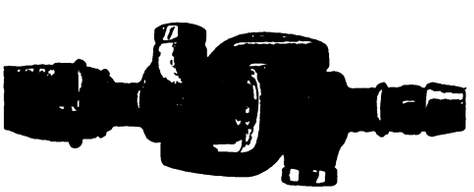


FIG. 2332.
MANNER OF COUPLING STRAIGHT-PORT COUPLERS.

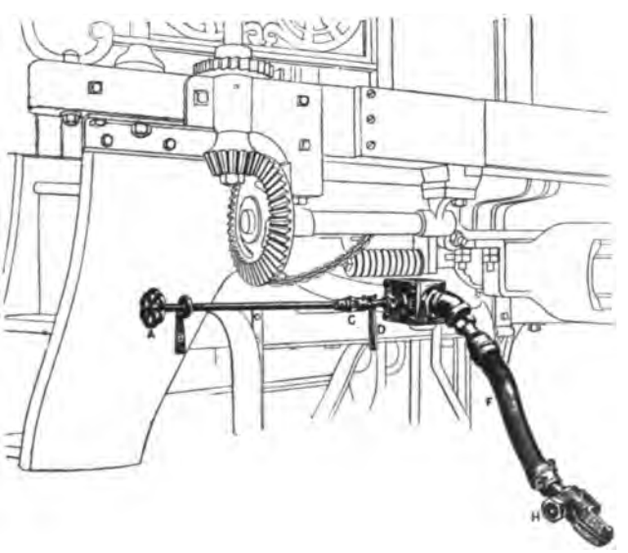


FIG. 2333. LOCATION OF END TRAIN PIPE VALVE.

FIGS. 2334-2335.
BRASS FACED COUPLER GASKETS.

FIG. 2336.
PLAIN HOSE COLLAR.

FIG. 2337.
HOSE COLLAR WITH LIP.

FIG. 2338. HOSE NIPPLE.

FIG. 2339.
GRAVITY RELIEF TRAP.

FIG. 2340.
GRAVITY RELIEF TRAP, COMPLETE, LESS STRAINER.

FIG. 2341.
GRAVITY RELIEF TRAP BODY.

FIG. 2342.
GRAVITY RELIEF TRAP STRAINER.

FIG. 2343.
GRAVITY RELIEF TRAP BAFFLE PLATE.

FIG. 2344.
GRAVITY RELIEF TRAP SPINDLE AND SEAT.

NAMES OF PARTS. FIG. 2345.

A. 1 *in Inlet Union Nipple*
B. 1¼ *in Outlet Union Nipple*
C. *Bolts and Nuts for Dome and Body*
D. *Balance Spindle with Hard Seats*
F. *Bottom Spring*
G. *Body of Regulator*
H. *Bottom Plug*
J. *Handle*
J. *Top Nut*
K. *Hollow Screw*
L. *Top Spring*
M. *Dome of Regulator*
N. *Lock Nut*
O. *Top Flange*
P. *Bottom Flange*
Q. *Top Spindle*
R. *Set Screw*
T. 1 *in Inlet Union Nut*
U. 1¼ *in Outlet Union Nut*

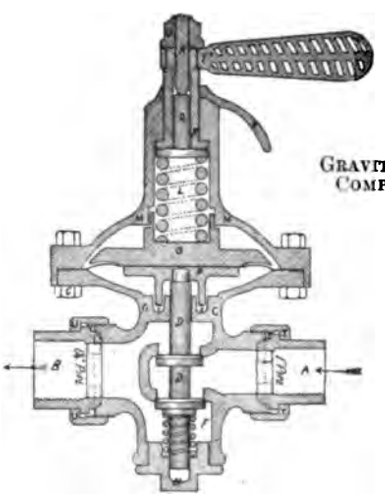


FIG. 2345.
BALANCE VALVE PRESSURE REGULATOR.

FIG. 2346.
GRAVITY RELIEF TRAP COMPOSITION SEAT.

FIG. 2347.
GRAVITY RELIEF TRAP COTTER.

FIG. 2348.
REGULATOR DIAPHRAGM.

FIG. 2349.
2-IN. SPLIT-FITTING.

FIG. 2350.
STEAM GAGE FOR CARS.

FIG. 2351.
LOCOMOTIVE STEAM GAGE.

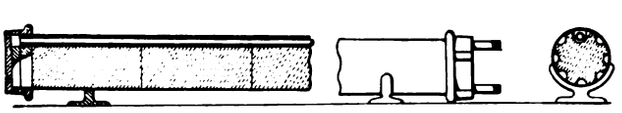
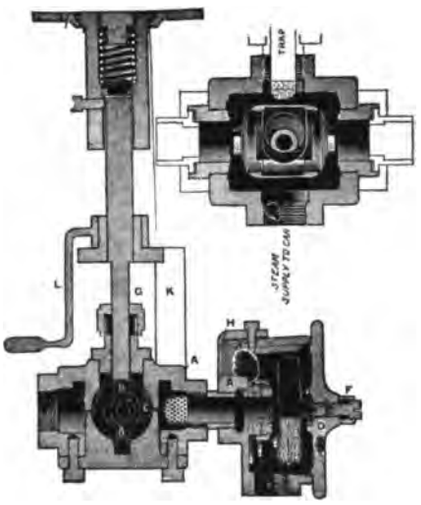


FIG. 2352.
TERRA COTTA STORAGE HEATER CYLINDER.

FIG. 2353.
2-IN. PIPE HOOK PLATE.

FIG. 2354. PIPE SHIELD.



FIGS. 2355-2356.
SECTION OF IMPROVED TRAIN PIPE VALVE AND EXCELSIOR STEAM TRAP.

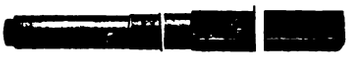


FIG. 2357. VALVE SPINDLE.

FIG. 2358.
VALVE SHEAVE SPRING.

FIG. 2359.
STRAINER NIPPLE.

FIG. 2360. VALVE BOTTOM PLATE.

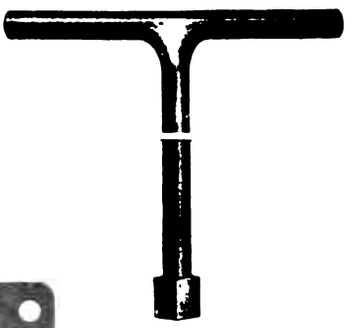


FIG. 2361.
VALVE T HANDLE.

FIG. 2362.
VALVE PISTON.

FIG. 2363.
VALVE FLANGE SHEAVE.

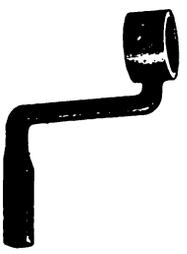


FIG. 2364.
VALVE Z HANDLE.

FIG. 2365 VALVE BODY.

FIG. 2366.
VALVE STUFFING-BOX

FIG. 2367.
VALVE CAM.

FIG. 2368.
BOTTOM PLATE BOLT.

FIG. 2369.
VALVE SEAT NUT.

FIG. 2370.
VALVE SEAT.

FIG. 2371.
TRAP DIAPHRAGM

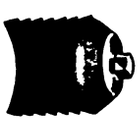


FIG. 2372.
TRAP VENTILATOR.

FIG. 2373. NO. 4 TRAP COMPLETE.

FIG. 2374. TRAP COVER.

FIG. 2375.
TRAP COLLAR

FIG. 2376.
TRAP SET SCREW.

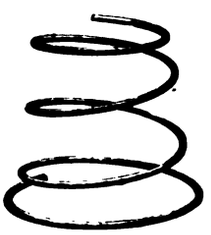


FIG. 2377.
TRAP SPRING.

FIG. 2378.
BRASS SEAT.

FIG. 2379.
FLOOR PLATE AND SOCKET.

FIG. 2380
TRAP SEAT.

FIG. 2381. UNION PACKING

FIG. 2382. UNION NIPPLE.

FIG. 2383. UNION COUPLING.

FIG. 2384. FLOOR PLATE.

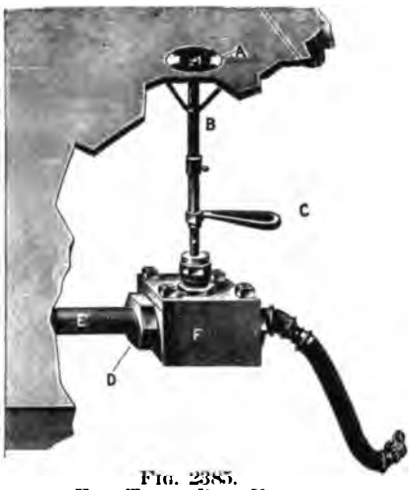


FIG. 2385.
END TRAIN PIPE VALVE.
NOTE.—THE PARTS OF THIS VALVE ARE SHOWN IN FIGS. 2357-2370.

FIG. 2386.
EXTENSION SOCKET.

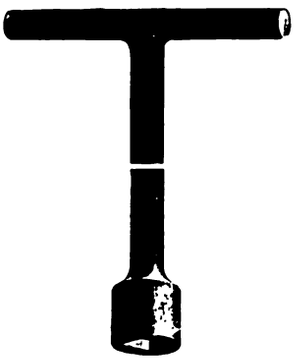


FIG. 2387.
SOCKET T WRENCH.

FIG. 2388.
SEALED JET ACCELERATOR.

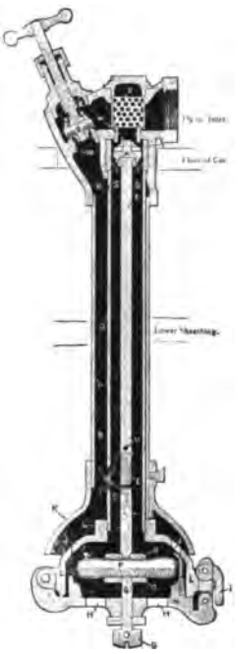


FIG. 2389.
VERTICAL STEAM TRAP.

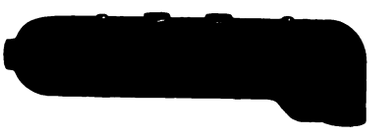


FIG. 2390.
EXPANSION DRUM, 2 HOLES.

FIG. 2392.
EXPANSION DRUM, 4 HOLES.

FIG. 2391.
SAFETY VALVE.

FIG. 2393.
DUPLEX DOUBLE COIL HEATER.

NAMES OF PARTS FIG. 2389.

A. *Automatically Operated Valve*
A'. *Disc for Automatic Valve*
B. *Blow-off Valve*
B' *Disc for Blow-off Valve*
C. *Cast Iron Trap Head*
D. *Strainer to Protect Valve "A"*
E. *Valve Stem*
F. *Expansive Diaphragm*
G. *Set Screw for Adjusting Trap*
H. *Outlet Ports of Trap*
I. *Cam Lock for Locking Cover "M" of Trap*
J. *Holes to Ventilate Casing Containing Diaphragm*
K. *Shield to Direct Course of Blow-off Discharge*
L. *Cast Iron Casing*
M. *Hinged Cover to Trap Casing*
N. *Hooks to Prevent Diaphragm Shifting*
O. *Plates Holding Diaphragm Horizontal*
P. *Outside Tube*
Q. *Inside Tube*
R. *Passage for Discharge of Blow-off*
S. *Passage for Discharge of Automatic Valve*
T. *Guides to Automatic Valves*
U. *Guides to Automatic Valve Stem*
V. *Spring Catch*
W. *Brass Valve Seats*
X. *Lock Nut*
Y. *Slot for Spring Catch*
Z. *Bonnet of Blow-off Valve*

NAMES OF PARTS FIG. 2391.

A. *Composition Ball*
B. *Cap*
C. *Body*
D. *Valve Seat*
E. *Set Screws*
F. *Steady Teat*
G. *Inlet from Drum*

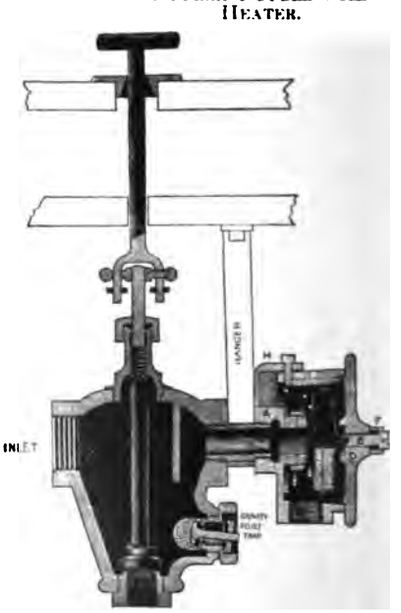


FIG. 2394. NO. 4.
EXCELSIOR AUTOMATIC STEAM TRAP.

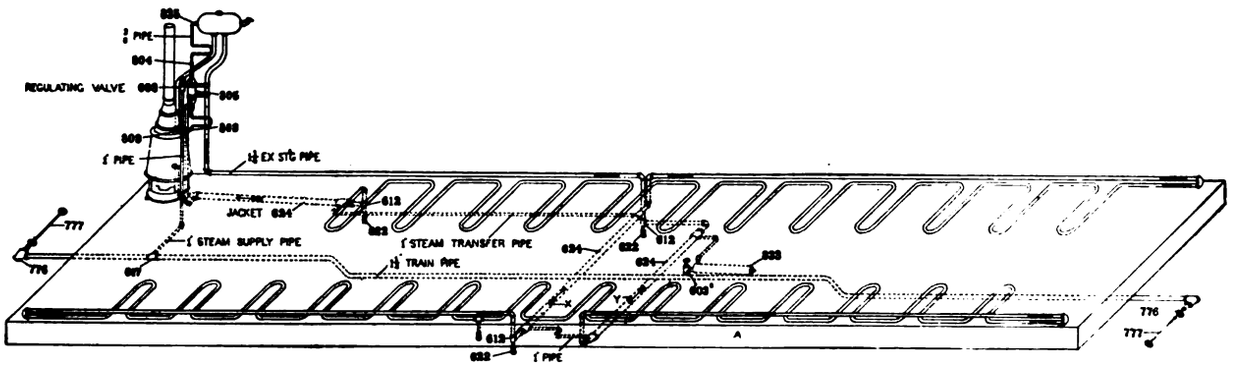


FIG. 2395. GENERAL VIEW OF HEATER AND CONNECTIONS.
STANDARD SYSTEM OF STEAM HEATING BY SINGLE WATER CIRCULATION (L-50). WATER IS HEATED AT 3 POINTS BY JACKETS (No. 624). SHOWN IN FIGS. 2403-2405.

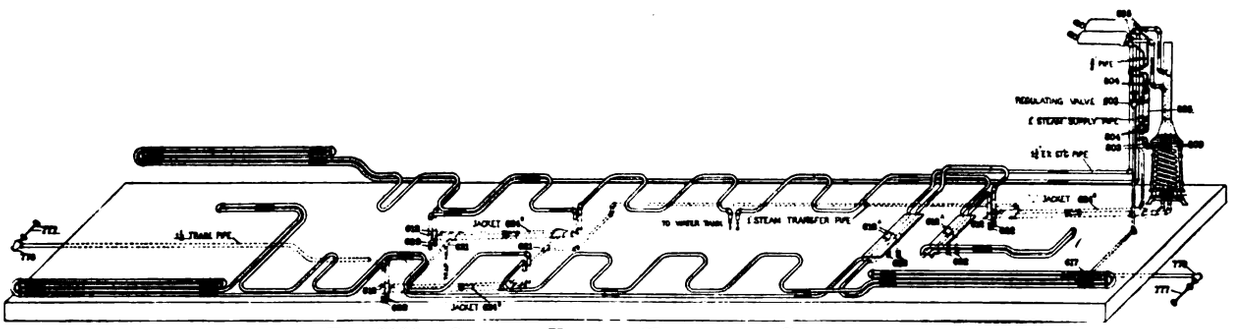


FIG. 2396. GENERAL VIEW OF HEATER AND CONNECTIONS.
STANDARD SYSTEM OF STEAM HEATING BY DOUBLE WATER CIRCULATION (L-145A). WATER IS HEATED AT 6 POINTS BY JACKETS (No. 624B). SHOWN IN FIGS. 2406-2410.

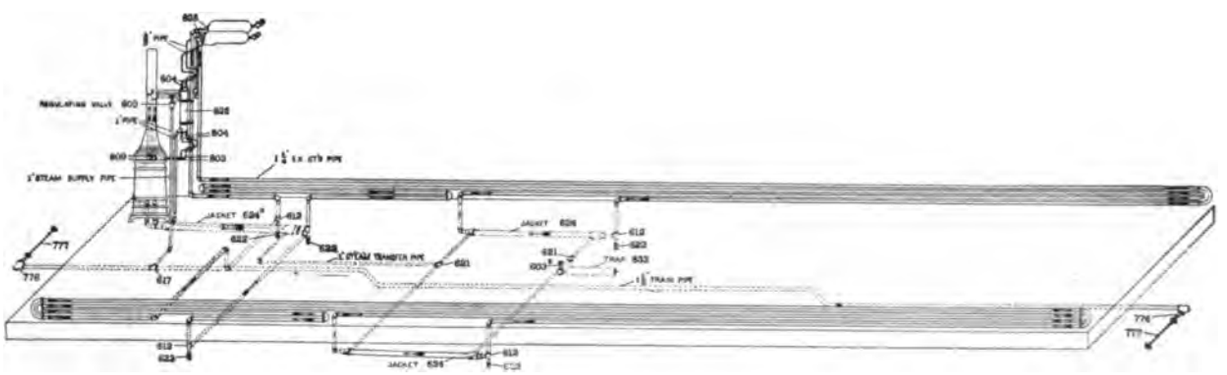


FIG. 2397. GENERAL VIEW OF HEATER AND CONNECTIONS.
STANDARD SYSTEM OF STEAM HEATING BY DOUBLE WATER CIRCULATION (L-145B). WATER IS HEATED AT 6 POINTS BY JACKETS (Nos. 624 AND 624B). SHOWN IN FIGS. 2403-2410.

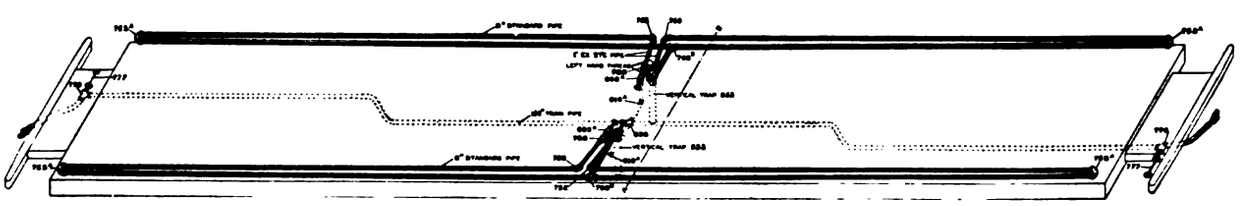
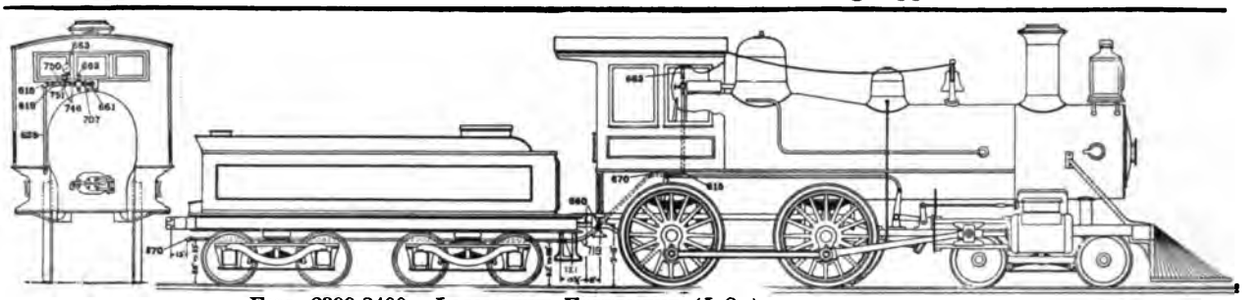


FIG. 2398. GENERAL VIEW OF PIPING AND CONNECTIONS.
DIRECT STEAM HEATING SYSTEM (L-811). ADAPTED TO ALL CLASSES OF CARS WITH SLIGHT MODIFICATIONS.

FOR NAMES OF PARTS OF THESE SYSTEMS, SEE LIST ON NEXT PAGE.

DIAGRAMS OF HEATING SYSTEMS. THE SAFETY CAR HEATING AND LIGHTING CO.



FIGS. 2399-2400. LOCOMOTIVE EQUIPMENT (L-8A).

NUMBERS AND NAMES OF PARTS FOR LOCOMOTIVE EQUIPMENT (L-8A). FIGS. 2399-2400.

CAT. NO. SPECIALS.

660. 1½ *in Union*
661. 1 *in Angle Valve (extra heavy)*
662. 1x1¼ *in Reducing Valve*
663. *Steam Gage*
664. *Bolt* ¼x1⅛ *in (hex. nut)*
670. 1½ *in 45 deg Ell*
674. *Link*
677. *Covering for* 1½ *in Pipe*
678. *Covering for* 1½ *in Ell*
719. *Steam Hose*, 1¼ *in*
721. *Nipple*, 1¼ *in Hose*, 1½ *in Pipe Thread*
722a. *Hose Band*, 1¼ *in (with bolts No.* 656b)
707. 1 *in Close Nipple*
746. 1¼ *in Nipple*, 3 *in Long*
750. 1½x1¼ *in Reducer*
751. 1¼x1¼x¼ *in Tee*

PIPE AND FITTINGS.

615. 1½ *in Ell*
618. 1½ *in R & L Coupling*
628. 1½ *in Standard Pipe*

NUMBERS AND NAMES OF PARTS FOR STANDARD HEATING SYSTEMS (L-50, L-145A, AND L-145B). FIGS. 2395-2397.

CAT. NO. SPECIALS.

603. 1 *in Angle Valve*
603b. 1 *in Drain Valve*
611. 1¼ *in Car Ell*
612. 1¼x¾x1¼ *in Tee*
622. ¾ *in Extra Heavy Cock*
624. *Single Jacket*
624b. *Double Jacket*
629. ¾ *in Extra Heavy Nipple*
639. *Directions for Management (framed)*
642. 1 *in Plug*
680. *Covering for* 1 *in Pipe*
681. *Covering for* 1 *in Ell*
682. *Covering for* 1 *in Tee*
755. *Covering for* 1¼ *in Tee*
756. *Covering for* 1¼ *in Ell*
771. *Covering for 624b Jacket*
781. *Covering for 624 Jacket*
805. *Anti-Hammering Jacket (single circulation)*
809. 1¼ *in Extra Heavy Ell*, ⅜ *in Side Outlet*
825. *Anti-Hammering Jacket (double circulation)*
833. *Automatic Trap (complete)*
835. *Pressure Connection*

TRAIN PIPE SPECIALS.

617. 1½x1 *in Tee*
677. *Covering for* 1½ *in Pipe*
679. *Covering for* 1½ *in Tee*
776. *End Train Pipe Valve*
777. *Extension Handle*

PIPE AND FITTINGS (OTHER THAN FOR TRAIN PIPE)

76. ¾ *in Pipe*
616. 1 *in Ell*
616a. 1 *in Ell, R & L*
621. 1 *in Tee*
625. 1 *in Standard Pipe*
626. 1¼ *in Extra Strong Pipe*
631. 1 *in R & L Coupling*
699. 1 *in Street Ell*
803. ⅜ *in Ell*
804. ⅜ *in R & L Coupling*

PIPE AND FITTINGS (TRAIN-PIPE).

618. 1½ *in R & L Coupling*
628. 1½ *in Standard Pipe*

NUMBERS AND NAMES OF PARTS FOR DIRECT STEAM HEATING SYSTEM (L-811). FIG. 2398.

CAT. NO. SPECIALS.

179. 2x⅜ *in Lag Screw*
603a. 1 *in Angle Valve*
638. 1½x1 *in Cross*
680. *Covering for* 1 *in Pipe*
681. *Covering for* 1 *in Ell*
708b. 2 *in Tee*
723a. 2 *in Return Bend*
741a. *Directions for Management (framed)*
749. *Pipe Strap*
752. 2x1 *in Ell (eccentric left)*
753. 2x1 *in Ell (eccentric right)*
783. 1 *in Open Return Bend with* 1 *in Back Outlet*
933. *Automatic Trap*

TRAIN PIPE SPECIALS.

677. *Covering for* 1½ *in Pipe*
683. *Covering for* 1½x1 *in Cross*
776. *End Train Pipe Valve*
777. *Extension Handle*

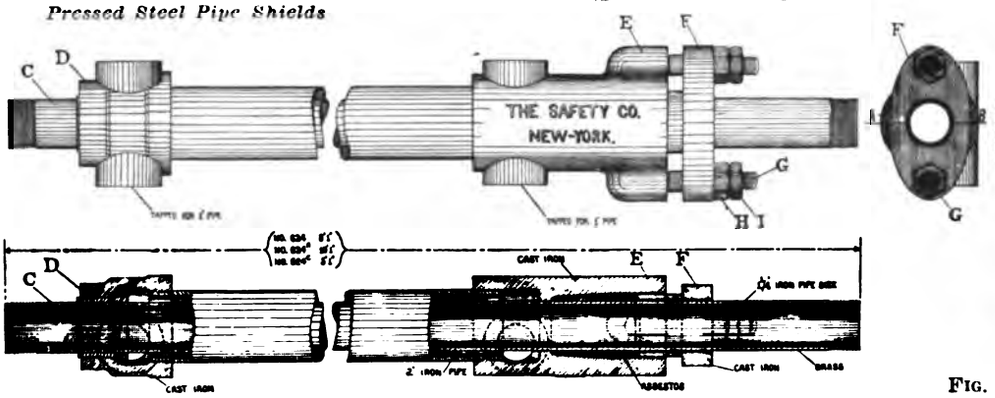
PIPE AND FITTINGS (OTHER THAN FOR TRAIN-PIPE).

616a. 1 *in R & L Ell*
625. 1 *in Standard Pipe*
183. 1 *in Extra Strong Pipe*
685. 2 *in Standard Pipe*
732. 2 *in R & L Coupling*

PIPE AND FITTINGS (TRAIN-PIPE).

618. 1½ *in R & L Coupling*
628. 1½ *in Standard Pipe*

Pressed Steel Pipe Shields



FIGS. 2403-2405. SINGLE JACKETS (NOS. 624, 624A, 624C).

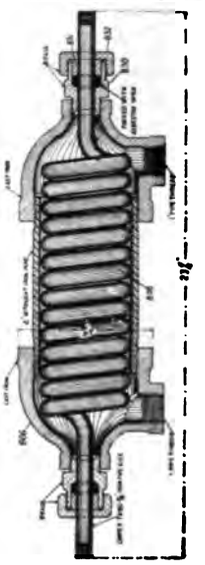
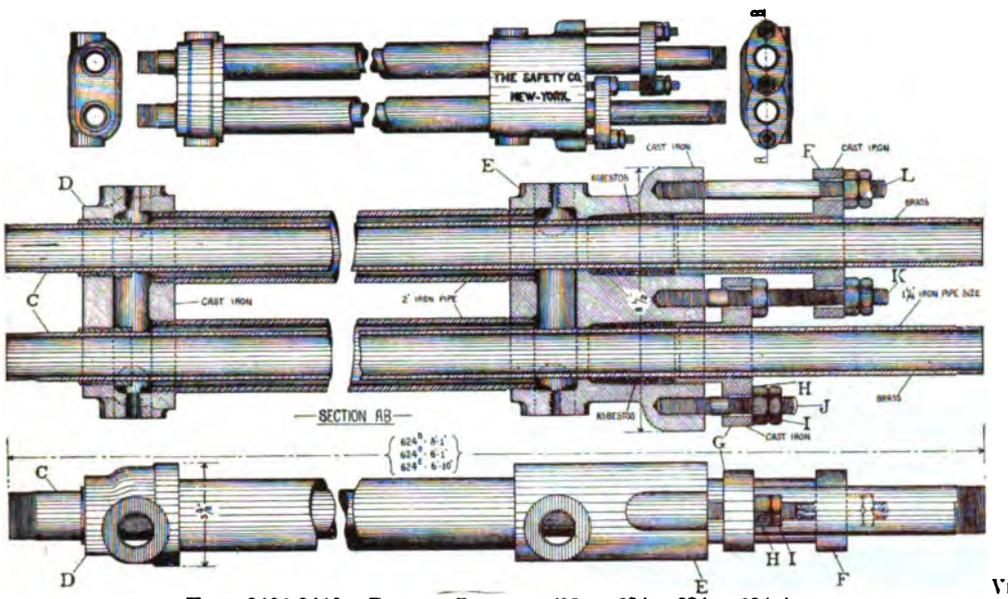


FIG. 2401. ANTI-HAMMERING JACKET (NO. 805). (SINGLE CIRCULATION.)

FIG. 2402. ANTI-HAMMERING JACKET (NO. 825). (DOUBLE CIRCULATION.)



FIGS. 2406-2410. DOUBLE JACKETS (NOS. 624B, 624D, 624E).

FIG. 2411.
VERTICAL STEAM TRAP (NO. 933).

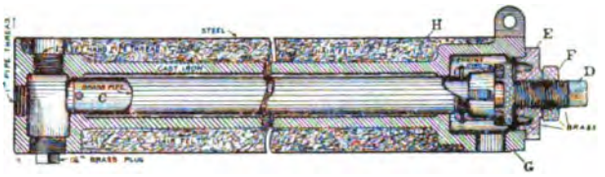
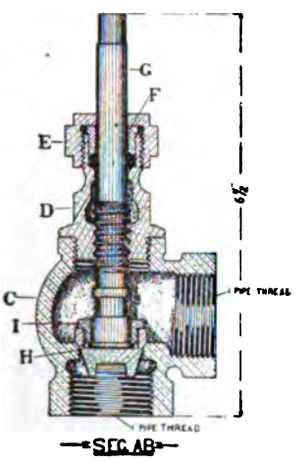
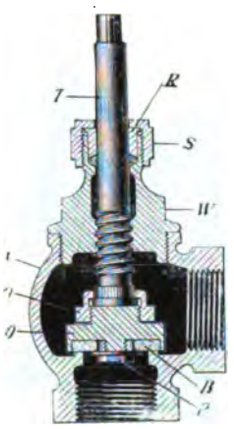


FIG. 2416. STEAM TRAP (NO. 833).



FIGS. 2412-2413.
1 IN. INLET VALVE (NO. 603).



FIGS. 2414-2415.
1 IN. DRAIN VALVE (NO. 603B).

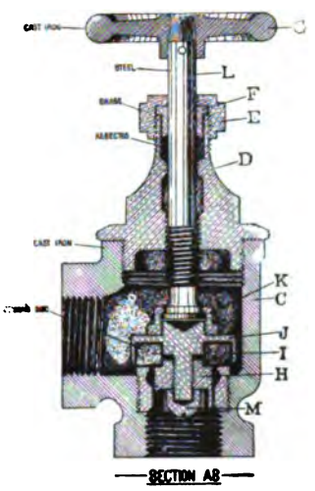


FIG. 2417.
1 IN. GRADUATING VALVE (NO. 603A).

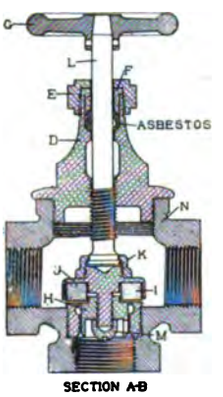
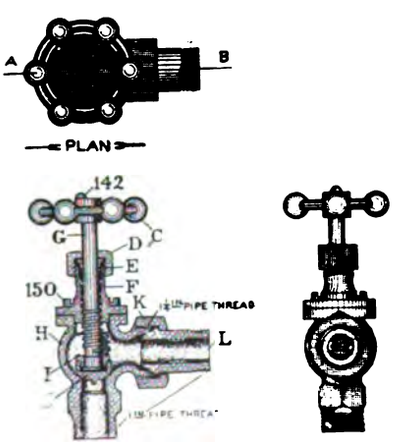
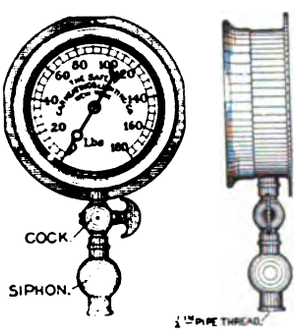


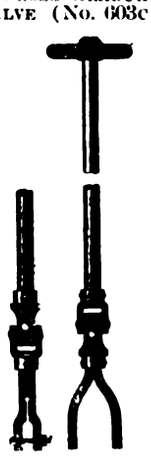
FIG. 2418.
1 IN. CROSS GRADUATING VALVE (NO. 603C).



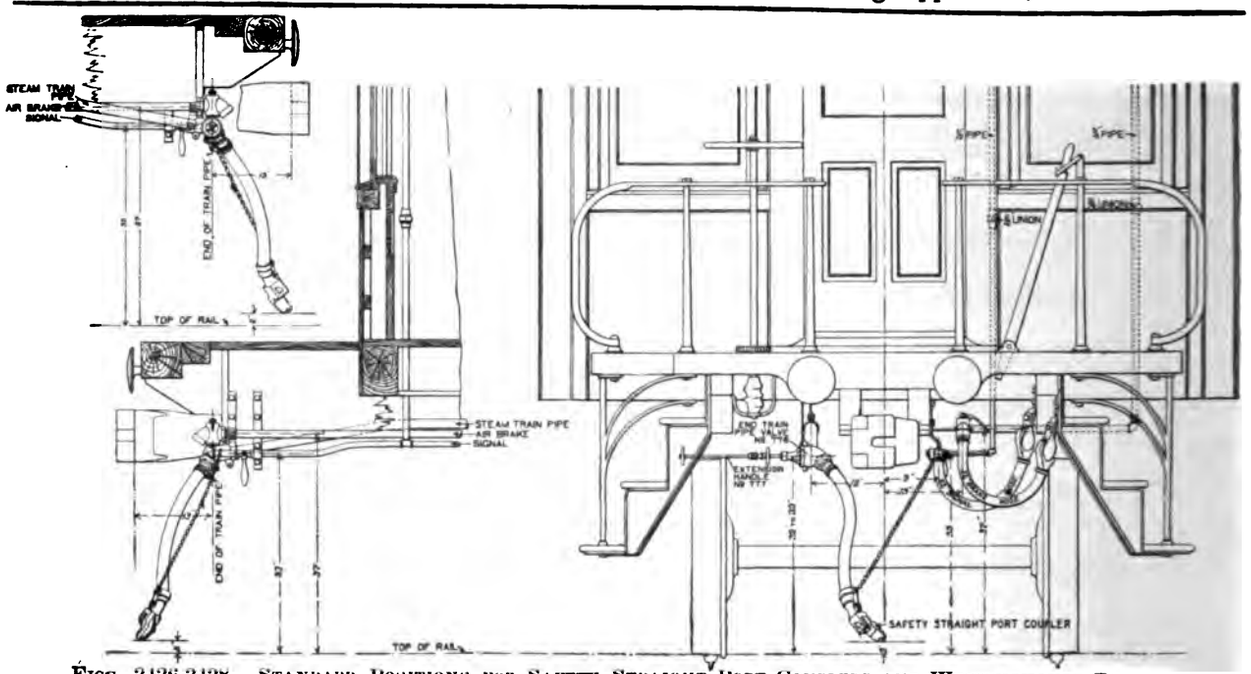
FIGS. 2419-2421.
1 IN. EXTRA HEAVY LOCOMOTIVE VALVE (NO. 661).



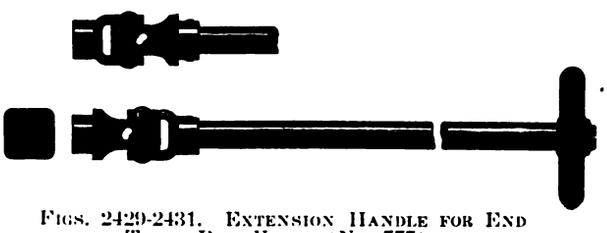
FIGS. 2422-2423.
LOCOMOTIVE STEAM GAGE (NO. 663).



FIGS. 2424-2425.
DRAIN VALVE EXTENSION HANDLE (NO. 619).

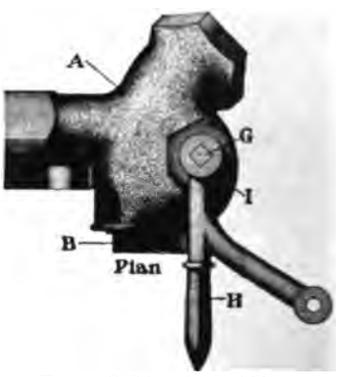


FIGS. 2426-2428. STANDARD POSITIONS FOR SAFETY STRAIGHT PORT COUPLERS AND WESTINGHOUSE BRAKE AND SIGNAL COUPLERS.



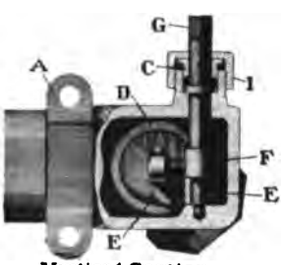
FIGS. 2429-2431. EXTENSION HANDLE FOR END TRAIN PIPE VALVE (No. 777).

Horizontal Section

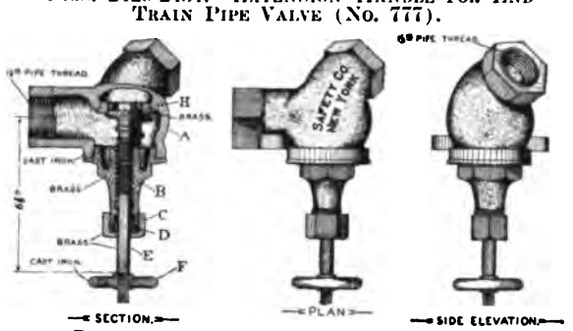


Plan

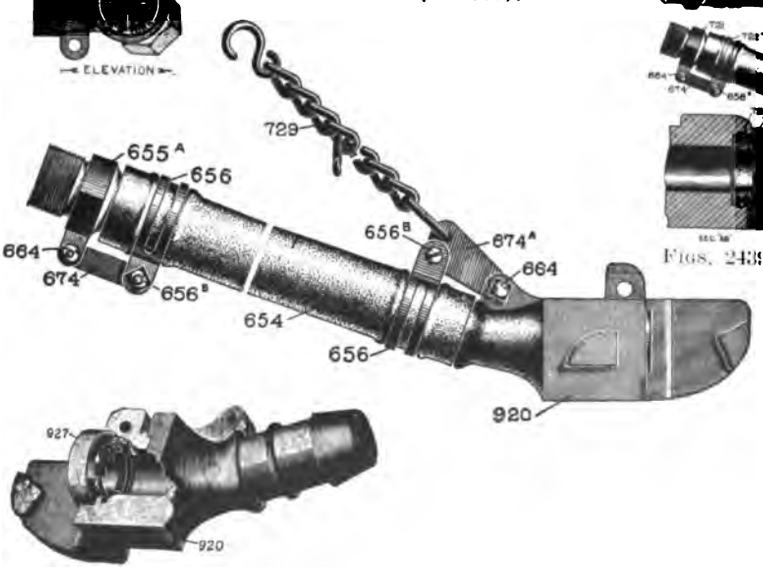
FIGS. 2436-2438. 1½ IN. END TRAIN PIPE VALVE (No. 876). (MAY BE OPERATED WITH LEVER FROM PLATFORM.)

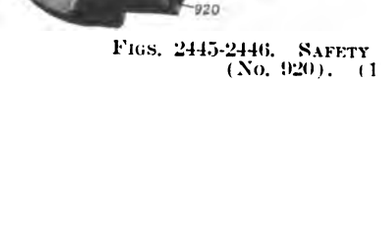


Vertical Section

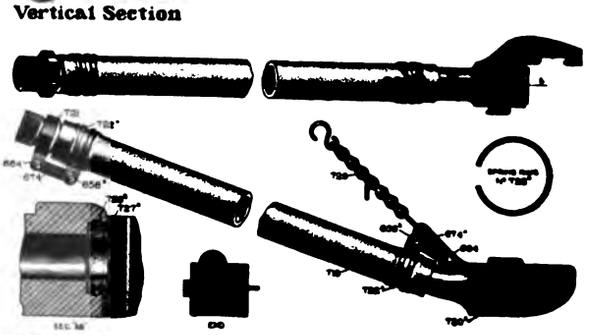


FIGS. 2432-2435. 1½ IN. END TRAIN PIPE VALVE (No. 776).





FIGS. 2445-2446. SAFETY STRAIGHT PORT COUPLER (No. 920). (1½ IN. HOSE.)



FIGS. 2439-2444. SAFETY STRAIGHT PORT COUPLER. (No. 720B). (1¼ IN. HOSE).

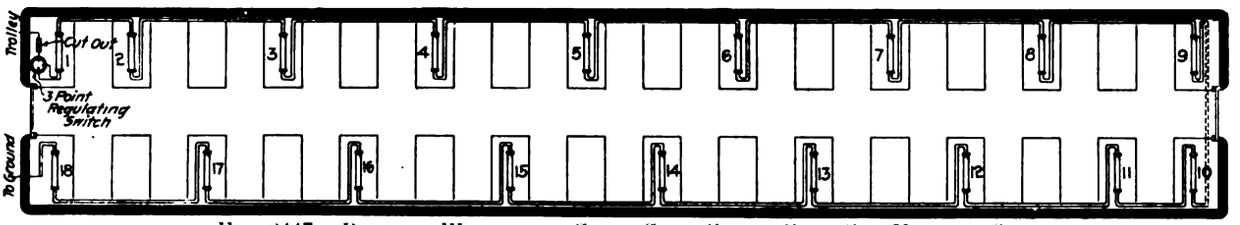
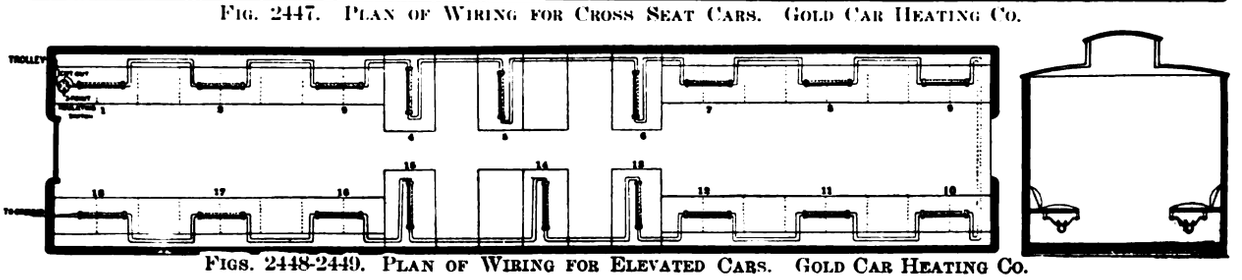


FIG. 2447. PLAN OF WIRING FOR CROSS SEAT CARS. GOLD CAR HEATING CO.



FIGS. 2448-2449. PLAN OF WIRING FOR ELEVATED CARS. GOLD CAR HEATING CO.

FIG. 2450. REGULATING SWITCH.

FIG. 2451. RESISTANCE COIL AND SUPPORT.

FIG. 2452. STANDARD ELECTRIC HEATER.

FIG. 2453. ELECTRIC HEATER.

FIG. 2454. HEATER COVER.

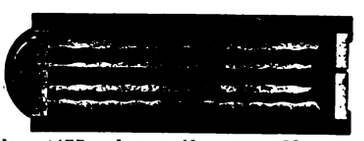


FIG. 2455. IDEAL ELECTRIC HEATER. 3-DEGREE PANEL TYPE.

ELECTRIC HEATING APPARATUS. GOLD CAR HEATING CO.

FIG. 2456. COIL FOR ELECTRIC HEATER, NO. 143L.

FIG. 2457. ELECTRIC HEATER, NO. 93.

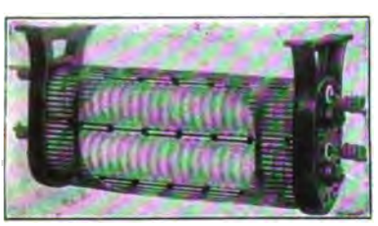


FIG. 2458. ELECTRIC HEATER, NO. 118W.

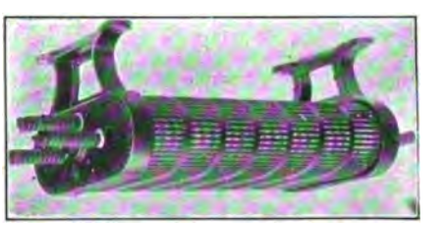


FIG. 2459. ELECTRIC HEATER, NO. 118M.

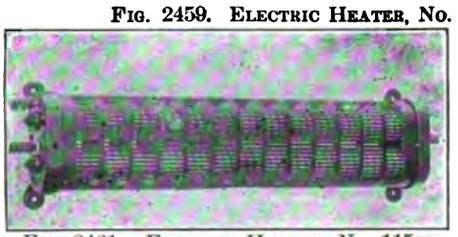


FIG. 2461. ELECTRIC HEATER, NO. 115W.

FIG. 2460. ELECTRIC COUPLERS, NO. 117.

FIGS. 2462-2463. THREE INTENSITY REGULATING SWITCH, NO. 158.

FIGS. 2464-2465. DOUBLE SNAP SWITCH, NO. 164.

ELECTRIC HEATING APPARATUS. CONSOLIDATED CAR HEATING CO.

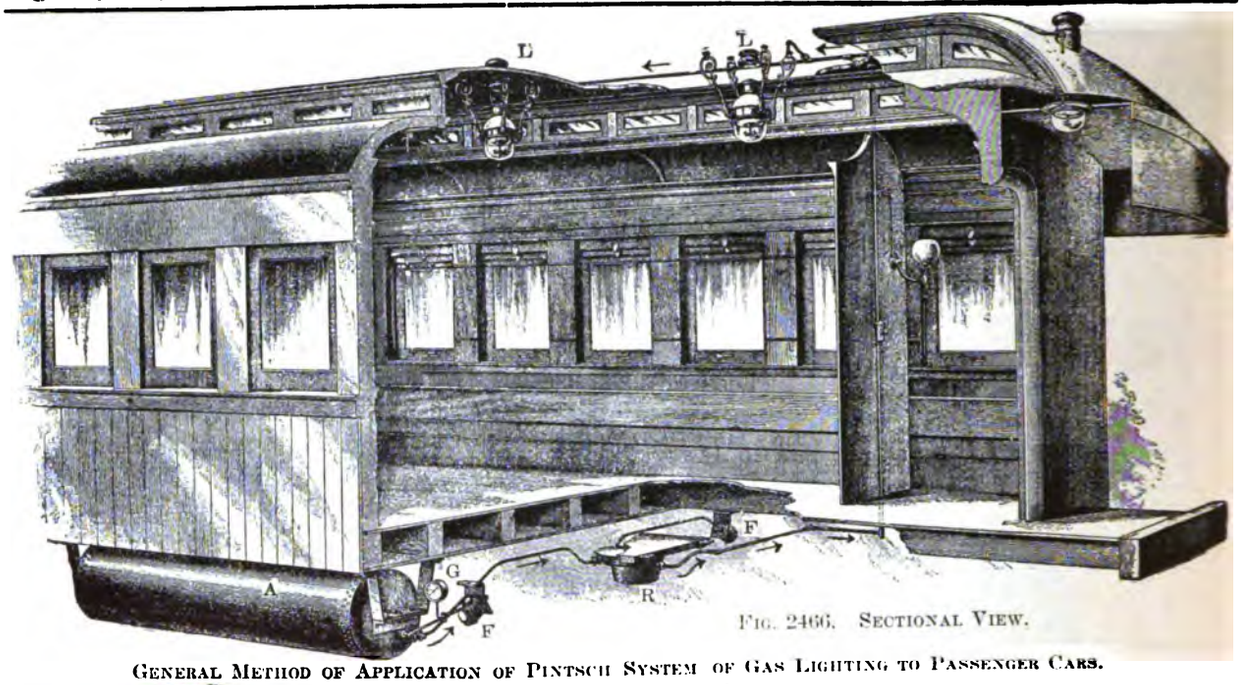


FIG. 2466. SECTIONAL VIEW.

GENERAL METHOD OF APPLICATION OF PINTSCH SYSTEM OF GAS LIGHTING TO PASSENGER CARS.

FIG. 2467.
No. 89. FILLING VALVE COVER (F).

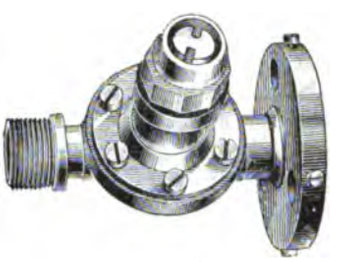


FIG. 2468.
No. 65. FILLING VALVE FOR CARS. SEE SECTION FIG. 2533.

FIG. 2469.
No. 118A. BRACKET FOR FILLING VALVE.

FIG. 2470.
No. 214. GAGE FOR CAR (G).

FIG. 2471.
NOS. 245-252. HOLDERS (A.)

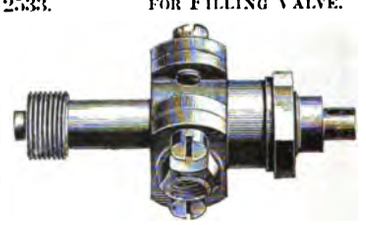


FIG. 2472.
No. 53B. HOLDER VALVE. SIDE OUTLETS ¼ IN. (SEE FIGS. 2534-2535.)

FIG. 2473.
No. 244.
REGULATOR (R).

FIG. 2474.
No. 9. CONNECTION PIECE, ¼ IN.

FIG. 2475.
No. 25, 25B, 25C.
MAIN COCK.
¼, ⅜ AND ½ IN.

FIG. 2476.
No. 135, 135C. COVER FOR MAIN COCKS.

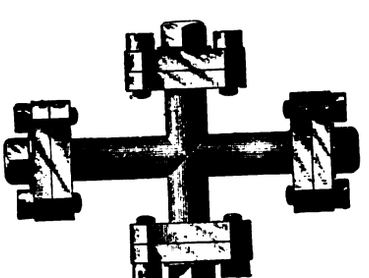


FIG. 2477.
No. 55A. FLANGED CROSS. ¼ IN.

FIG. 2478.
NOS. 54-55. FLANGED TEES, ¼ IN. SIDE OUTLETS, ⅛ IN. AND ¼ IN.

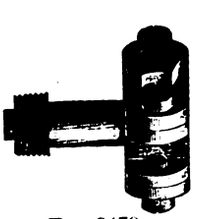


FIG. 2479.
No. 49. FLANGE TEE FOR REGULATOR, ¼ IN.

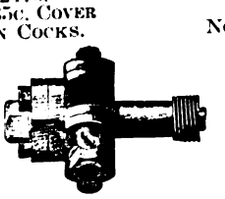


FIG. 2480.
No. 53A. FLANGE TEE FOR REGULATOR, ¼ IN.

FIG. 2481.
NOS. 12-13. TEE FLANGE UNIONS ¼X¼ IN.; ¼X¼ IN.

FIG. 2482.
No. 17A. ANGLE FLANGE, ⅛ IN.

FIG. 2483.
No. 16A, B AND C TEE FLANGES. ¼X¼ IN.; ⅜X¼ IN.; ½X⅛ IN.

FIG. 2484.
No. 3.
FLANGE FOR NOS. 49, 53B, 53A AND 120.

No. 167. Bracket Back. ⅜-In. ½-In. ⅛-In. | Nos. 27-56. Locknuts. ⅛-In. | No. 8a. Flange. ⅛-In. | No. 21. Burner Cock. ⅛-In. | Nos. 4-5. Connection. ⅛-In. ¼-In. | Nos. 32-32a. Elbow. ⅛-In. ½-In. | Nos. 130-134. Coupling. | No. 170. Bolt for Tankstrap. 2½x⅜-In. | No. 171. Bolt for Filling Valve. 1¾x½-In. | Nos. 29-57. Cap. ⅜-In. ½-In. | Nos. 28-28a-28b. Reducing Elbows. ⅜x⅛-In. ½x⅛-In. ¼x⅛-In.

Figs. 2485-2495. Bolts and Fittings.

No. 26. (Give Thickness of Roof.) Nipple to Support Lamp. ⅜-In. Fig. 2496.

No. 31a. Plug. ½-In. Fig. 2497.

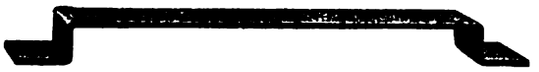


Fig. 2498. No. 243. Regulator Strap.

Fig. 2499. Pipe Strap.

Fig. 2500.

140. *Screws for Gland of Nos. 21, 25, 25b, 25c, etc. (brass)*
146. *Screws for Regulator Inlet No. 1b*
146a. *Screw for Top Gland of No. 66 (brass)*
148. *Screws for Valve Covers Nos 89 and 90 (brass)*
149. *Screws for Gland of No. 65*
150. *Screws for Flange Fittings, Nos. 10, 12, 13 25c, 49, 53b, etc*
150a. *Screws for Large Valves, etc. same as No. 150 (brass)*
152. *Screws for Bonnet of No. 65*
153. *Screws for Valve Carrier of No. 65, Retaining Screw (brass)*
159. *Screws for Flange Fittings, Nos. 8a, 16c, 17a, etc.*

Fig. 2501.

142. *Check Screws for Clusters*
144. *Screw for Flat Reflector*
151. *Screws for Hinge Cover and Spring Catch (brass)*
154. *Screws for Vestibule Lamp Diaphragm*
156. *Screws for Hinge Cover, Spring Catch and Crown (brass)*
156a. *Screws for Cluster Stem (brass)*
157. *Screws for Reflectors, Bezel Ring, etc.*

161. *Straps for ⅜ in Pipe*
162. *Straps for ¼ in Pipe*
163. *Straps for ⅛ in Pipe*
164. *Straps for ½ in Pipe*

Fig. 2502.

175. *Lags for Hanging Holders, 7x⅝ in*
176. *Lags for Hanging Holders, 5x⅝ in*
177. *Lags for Filling Valve Brackets, 2½x½ in*
179. *Lags for Hanging Regulator, 2x⅜ in*
180. *Lags for Hanging Regulator, 3½x⅜ in*

Fig. 2503.

188. *1¼ in. Wood Screws, No. 14 r. h. nickel, for Vestibule Lamps*
189. *¾ in. Wood Screws, No. 10 r. h. brass, for Main Cocks and Covers*

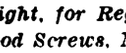


Fig. 2504.

185. *1½ in Wood Screws, No. 14 f. h. bright, for Regulators*
186. *1 in Wood Screws, No. 8 f. h. bright, for Pipe Straps*
187. *¾ in Wood Screws, No. 8 f. h. bright, for Pipe Straps*

Fig. 2505.

155. *Screws for Hinge and Spider*
155a. *Screws for Bracket*
158. *Screws for Inner Ring of Crown*

No. 6. Brass Ring for Nos. 4 and 5. Fig. 2506.

No. 58. For Large Valves.

No. 60. For Flanges. ⅜-In.x¼-In. Pipe.

No. 62. For Flanges. ⅛-In. Pipe.

Figs. 2507-2509. Lead Washers.

No. 14a. No. 14. Figs. 2510-2511. Flanges for Gages.

No. 45. No. 46. Figs. 2512-2513. Keys for Lamps and Valves.

No. 231. Mill Base Check. Fig. 2514.

No. 34. Tee. ½-In. No. 230. Pillar for Bracket Lamp. Figs. 2515-2516.

No. 23. Iron Washer.

No. 24. Rubber Washer for No. 23. Figs. 2517-2518.

No. 222. Burner. Nos. 227 and 575. 4 Flame Clusters.

Nos. 226 and 575a. 2 Flame Clusters.

No. 226a. Vestibule Lamp Cluster.

No. 1112. Argand Burner for 87a Lamp.

No. 21a. Burner Cock for 205a Lamp.

No. 235. Argand Burner for 86a Lamp.

Figs. 2519-2525. Clusters and Burners.

No. 200.
WIND GUARD.
FIG. 2526.

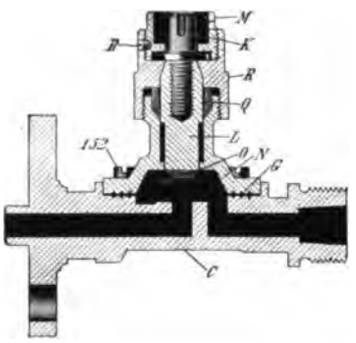
NOS. 203-204.
VENTILATORS.
6½ IN.; 4⅝ IN.
FIG. 2527.

No. 300. TORCH AND KEY.
FIG. 2528.

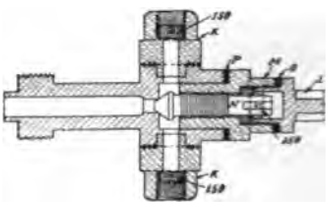
No. 135B. COVER FOR MAIN COCKS. NOS. 25, 25B, 25C.
FIG. 2529.

No. 22. MAIN COCK FOR POSTAL CARS.
FIG. 2530.

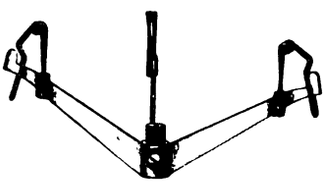
No. 80B. SHADE HOLDER FOR No. 102. FIG. 2531.



SECTION OF FILLING VALVE No. 65.
FIG. 2533.



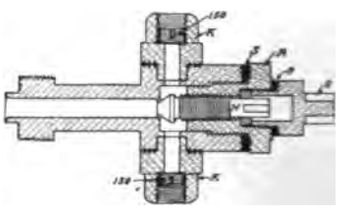
SECTION OF HOLDER VALVE No. 53B.
(OLD STYLE.)



No. 80C. SHADE HOLDER FOR No. 236. FIG. 2532.

LIST OF PARTS. FIG. 2533.

B.	*Set Screw*
C.	*Valve Body*
G.	*Gasket for Bonnet*
K.	*Valve Stem*
L.	*Valve Carrier*
M.	*Valve Stem Nut*
N.	*Bonnet*
O.	*Disc*
Q.	*Packing*
R.	*Packing Nut*
152.	*Screw for Bonnet*



SECTION OF HOLDER VALVE No. 53B.
(NEW STYLE.)
FIGS. 2534-2535.

LIST OF PARTS. FIGS. 2534-2535.

K.	*Flanges*	P.	*Gasket for Gland*
L.	*Cap*	Q.	*Cap*
M.	*Flange Gland*	R.	*Gland*
N.	*Valve*	S.	*Gasket for Gland*
O.	*Gasket for Cap*	150.	*Flange Screws*

No. 109. MICA CHIMNEY. FIG. 2536.

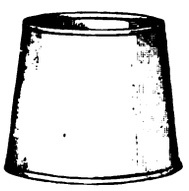
No. 112.
FOUR FLAME REFLECTOR.
FIG. 2537.

No. 113.
TWO FLAME REFLECTOR.
FIG. 2538.

No. 111A.
CUP REFLECTOR.

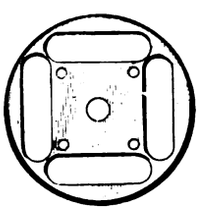
No. 110.
RING REFLECTOR.
FIGS. 2539-2540.

No. 114. REFLECTOR FOR WALL LAMP.
FIG. 2541.



No. 285.
ENAMELED CHIMNEY.
FIG. 2542.

No. 577.



No. 576.

No. 410.

No. 107.

No. 530.

FIGS. 2543-2547. REFLECTORS.

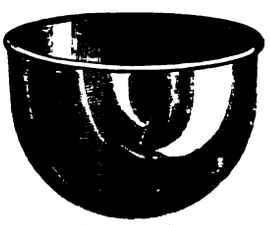
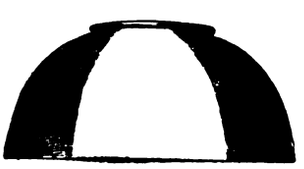


FIG. 2548.
No. 99. 8½ IN. CLEAR GLASS BOWL.
No. 100. 9 IN. CLEAR GLASS BOWL.
No. 106. 10 IN. CLEAR GLASS BOWL.
No. 1084. 6 IN. CLEAR GLASS BOWL.

No. 102.
4 IN. OPAL GLOBE.
FIG. 2549.



No. 104.
OPAL DOME.
FIG. 2550.

No. 103A. GLASS FOR No. 205A LAMP.
FIG. 2551.

No. 103. GLASS FOR No. 205 LAMP.
FIG. 2552.

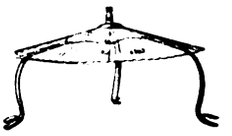
No. 237.

No. 234a.
FIGS. 2553-2556.

No. 234.
CHIMNEYS.

No. 1090.

No. 202. 2-IN.
FIGS. 2557-2558.

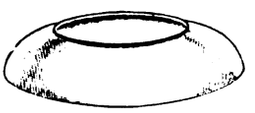


No. 201. 4-IN.
MICA CANOPIES.

No. 236.
SHADE FOR READING LAMP.
FIG. 2559.

No. 295.
7-IN. RIBBED DOME.
FIG. 2560.

No. 594.
9-IN OPAL DOME.
No. 595. 9-IN ETCHED DOME.
FIG. 2561.



No. 492.
10-IN. OPAL DOME.
FIG. 2562.

No. 500.
5-IN. CUT OR PRESSED BOWL.
FIG. 2563.

No. 493. 10-IN. ETCHED BOWL.
No. 493a. 10-IN. CLEAR GLASS BOWL.
FIG. 2564.

No. 596. 9-IN CLEAR GLASS BOWL.
No. 596a. 9-IN. CLEAR GLASS BOWL, FIGURE ETCHED.
No. 597. 9-IN. ETCHED BOWL.
FIG. 2565.

No. 100a.
9-IN. PRESSED BOWL.
FIG. 2566.

No. 422.
11-IN. PRESSED BOWL.
FIG. 2567.

No. 423.
11-IN. ETCHED BOWL.
FIG. 2567.

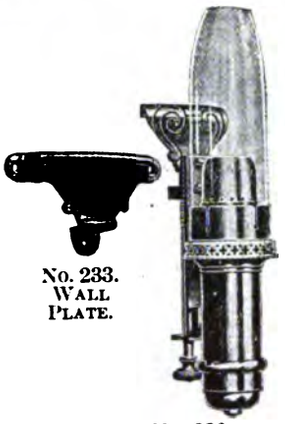
LAMP GLASSWARE.

No. 205a.
WALL LAMP. FIG. 2568.

No. 85a. DROP SWING BRACKET LAMP.
FIG. 2569.

No. 86. DROP BRACKET (KEY COCK).
No. 86a. DROP BRACKET (THUMB COCK).
SEE SECTION, FIG. 2609. FIG. 2570.

No. 194. 2-FLAME VESTIBULE LAMP.
No. 195. 4-FLAME VESTIBULE LAMP.
SEE SECTION FIG. 2607.
FIG. 2571.

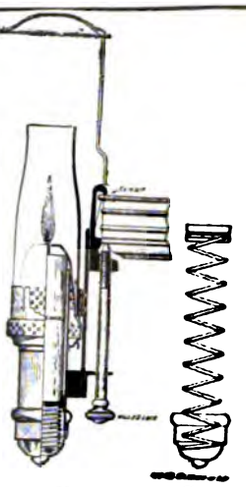


No. 233.
WALL
PLATE.

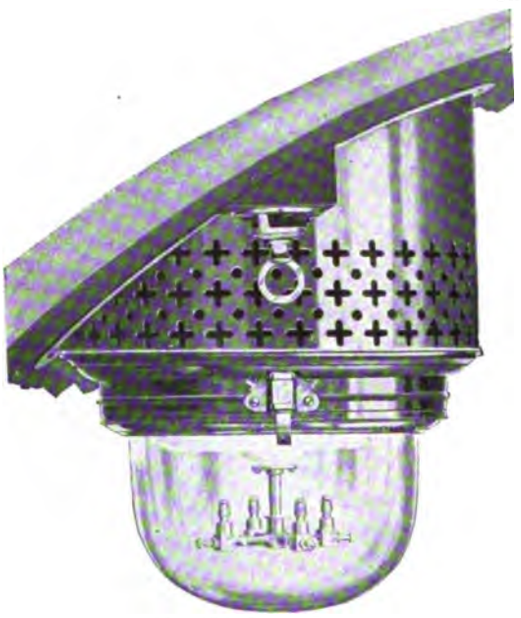
No. 232.
CANDLE
BRACKET LAMP.
FIGS. 2572-2573.

No. 282.
REMOVABLE CANDLE
BRACKET. FIG. 2574.

CANDLE BRACKETS.

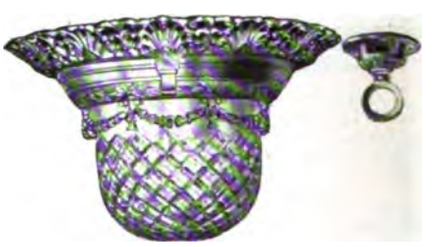


BRACKET EMERGENCY CANDLE
LAMP, PULLMAN PATTERN.
FIGS. 2575-2576.

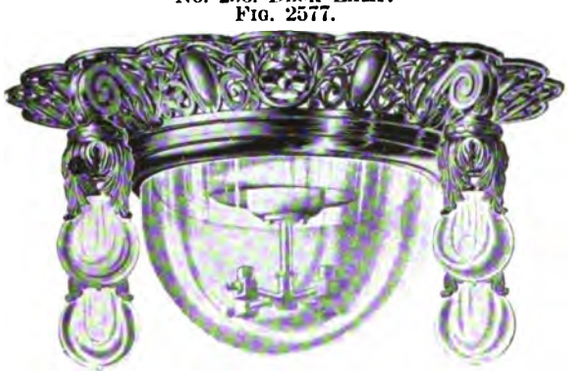


No. 256. DECK LAMP.
FIG. 2577.

No. 218. DECK LAMP.
SEE SECTION FIG. 2608.
FIG. 2578.



No. 253. DECK LAMP.
(5-IN. BOWL.)
SEE SECTION FIG. 2615.
FIG. 2580.



No. 431. COMBINATION DECK LAMP.
FIG. 2579.

No. 257. DECK LAMP (INVERTED ARGAND).
No. 258c. COMBINATION LAMP (4-FLAME).
No. 257c. COMBINATION LAMP (INVERTED ARGAND).
No. 258c. COMBINATION LAMP (4-FLAME).
SEE SECTIONS FIGS. 2612-2614.
FIG. 2582.

No. 219. DECK LAMP.
SEE SECTION FIG. 2608.
FIG. 2581.

No. 196. Lamp. Fig. 2583.

No. 196. Lamp, with Mail-car Reflector. Fig. 2584.

No. 211. Lamp. Fig. 2585.

No. 215. Lamp. Fig. 2586.

No. 450. Argand Lamp. See Section Fig. 2617. Fig. 2587.

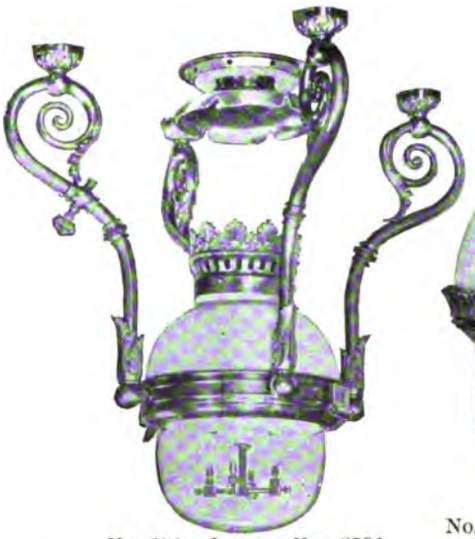
No. 428. Lamp. See Section Fig. 2618. Fig. 2588.

No. 190. Lamp. Fig. 2589.

No. 429 Lamp. Fig. 2590.

Four-Arm Lamps.

For Lamps Nos. 190, 196, 211, 215 and 429, See Section of Standard Body, Fig. 2606.



No. 191. LAMP. FIG. 2591.

No. 87a. ARGAND BRACKET LAMP. FIG. 2592.

No. 208. LAMP. FIG. 2593.

No. 427. LAMP. SEE SECTION FIG. 2619. FIG. 2594.

No. 440. DECK LAMP. SEE SECTION FIG. 2620. FIG. 2595.

No. 433. LAMP. FIG. 2596.

No. 434. COMBINATION LAMP. FIG. 2597.

No. 198. COMBINATION LAMP. SEE SECTION FIG. 2610. FIG. 2598.

LAMPS.

FOR LAMPS NOS. 191, 208 AND 434, SEE SECTION OF STANDARD LAMP BODY, FIG. 2606.

No. 375. COMBINATION BRACKET LAMP. FIG. 2599.

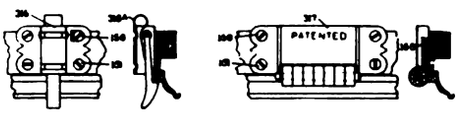
No. 369. ELECTRIC PENDANT. FIG. 2602.

No. 371. ELECTRIC PANEL BRACKET. FIG. 2600.

No. 370. ELECTRIC PANEL BRACKET. FIG. 2603.

No. 372. ELECTRIC PANEL BRACKET. FIG. 2601.

No. 84. COMBINATION BRACKET. FIG. 2604.



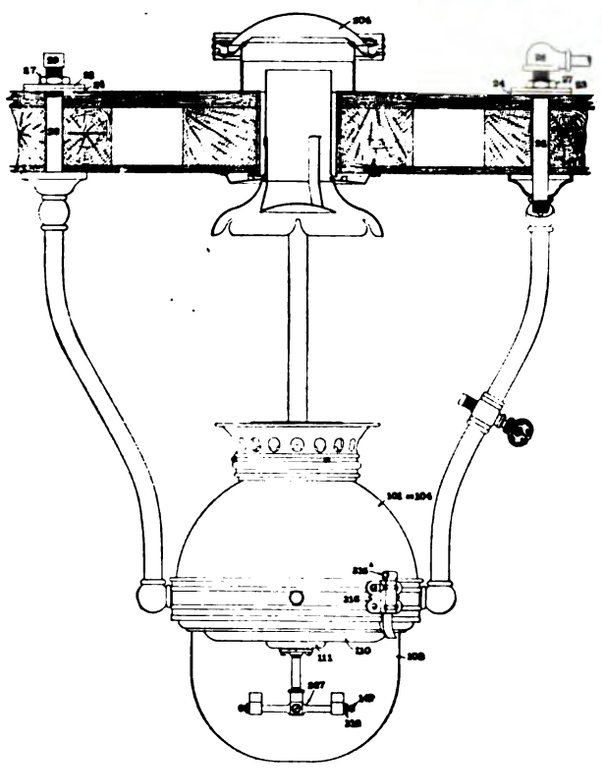


FIG. 2605. METHOD OF HANGING FOUR-ARM LAMP.

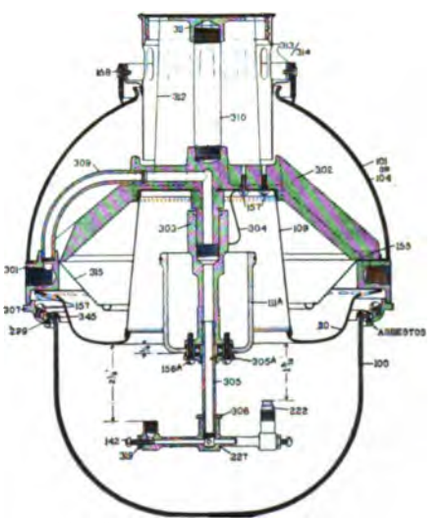


FIG. 2606. SECTION OF STANDARD BODY.

LIST OF LAMP PARTS (SEE SECTIONS.)

CAT. NO.	DESCRIPTION.
79.	⅛ *in Extra Strong Pipe*
203a.	6½ *in Ventilator*
203b.	6½ *in Ventilator*
204a.	4⅝ *in Ventilator*
222a.	*Hexagon Burners*
283.	*Cast-iron Body Ring*
284.	*Spider*
286.	*Lower Diaphragm*
287.	*Upper Diaphragm*
288.	*Deflecting Plate and Chimney*
288a.	*Deflecting Plate and Chimney*
289.	*Bracket*
289a.	*Bracket for Gas-way Connection*
290.	*Lower Thimble*
290a.	*Lower Thimble*
291.	*Roof Thimble*
292.	*Spacing Block*
293.	*Shield*
299.	*Asbestos Wick*
301.	*Body Ring*
302.	*Spider*
303.	*Extension Pillar*
304.	*Extension Pillar Lock*
305.	*Cluster Stem*
305a.	*Cluster Stem Flange*
305b.	*Cluster Stem Flange*
306.	*Lock Nut for Cluster Stem*
307.	*Bezel or Ring for Bowl*
309.	*Gas-way Tube*
310.	*Post*
311.	*Top Piece for Flues*
312.	*Flues*
313.	*Chimney*
314.	*Ring for Fastening Crown*
315.	*Diaphragm*
316.	*Spring Catch (complete)*
316a.	*Spring for Catch*
317.	*Hinge Cover*
319.	*Lock Nuts for Check Screws*
320.	*Body Casting*
321.	*Flues*
322.	*Top Piece for Flues*
323a.	*Diaphragm*
324.	*Ventilating Chimney*
325.	*Center Post for Flues*
326.	*Cock (complete)*
327.	*Gas-way*
338.	*Cock and Sleeve*
339.	*Thumb Piece and Socket for Cock*
345.	*Spun Globe Holder Ring*
346.	*Deflecting Plate*
349.	*Gas-way Tube*
380.	*Body Ring*
381.	*Spider*
382.	*Center Casting, enameled*
383.	*Center Casting Diaphragm*

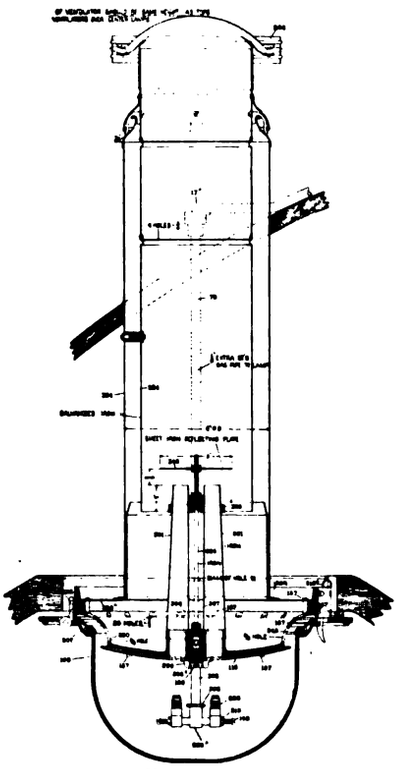


FIG. 2607.
SECTION OF VESTIBULE LAMP, No. 194.

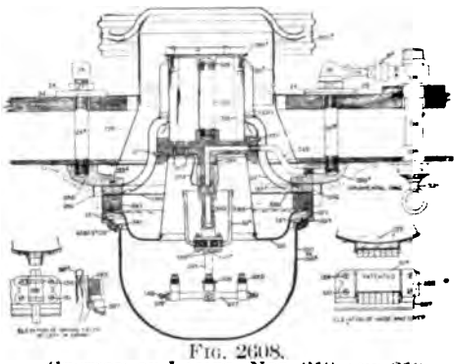


FIG. 2608.
SECTION OF LAMPS, NOS. 218 AND 219.

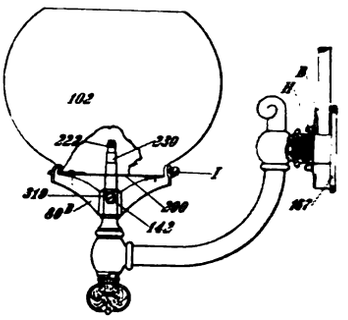


FIG. 2609.
SECTION OF BRACKET LAMP. No. 86a.

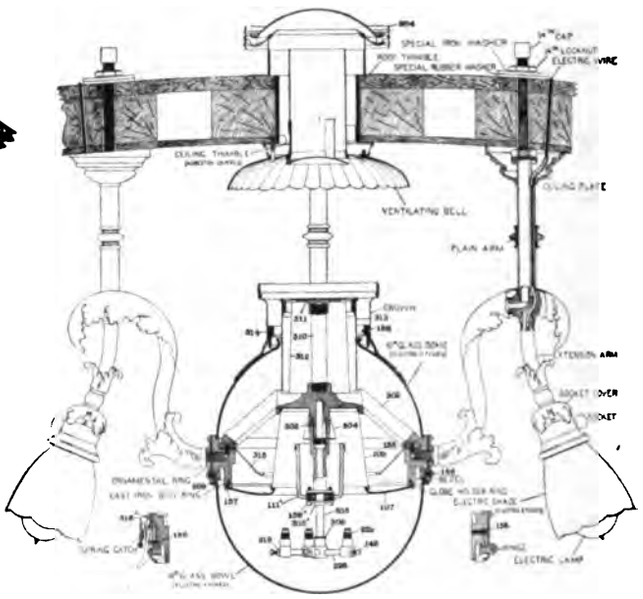


FIG. 2610. SECTION OF LAMP, NO. 198.

No. 198. FIG. 2611.
GAS ARM FOR LAMP

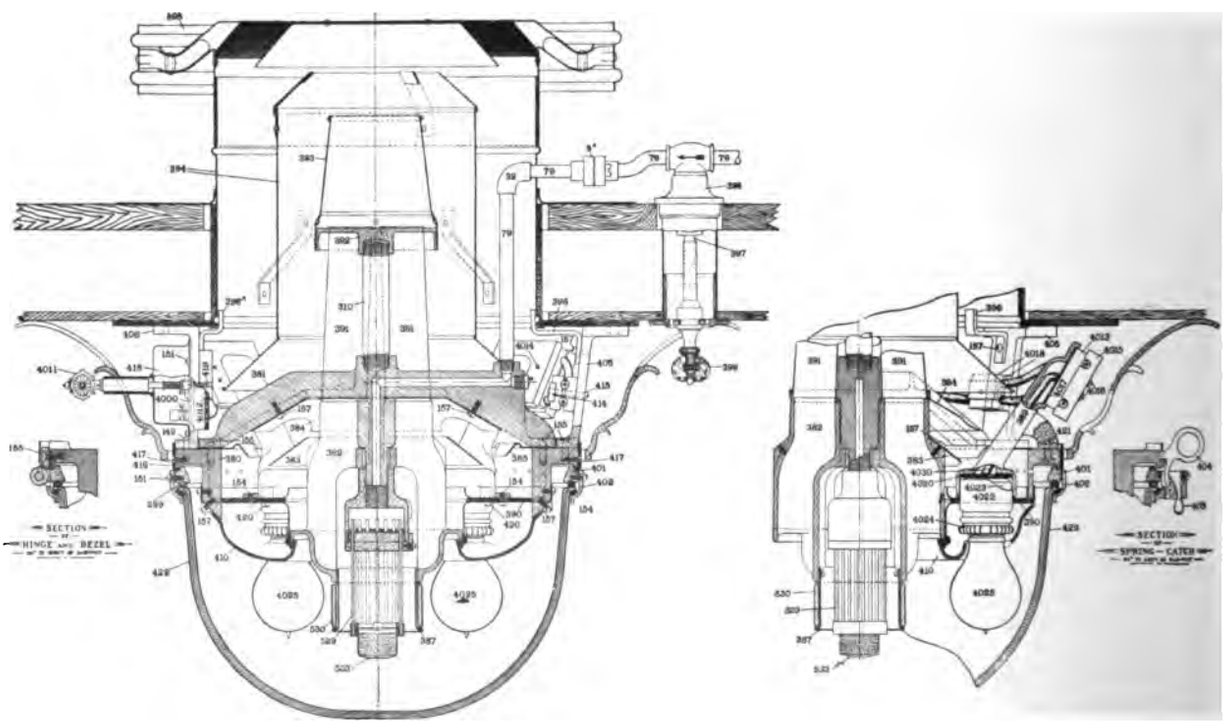
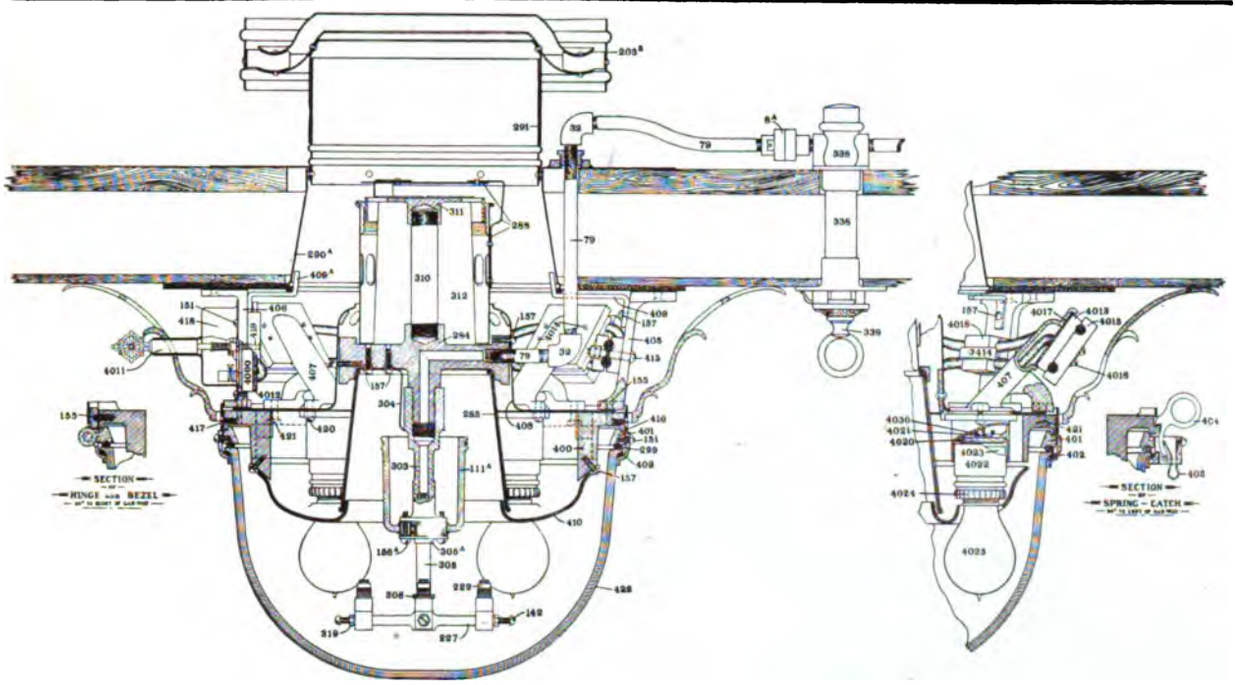
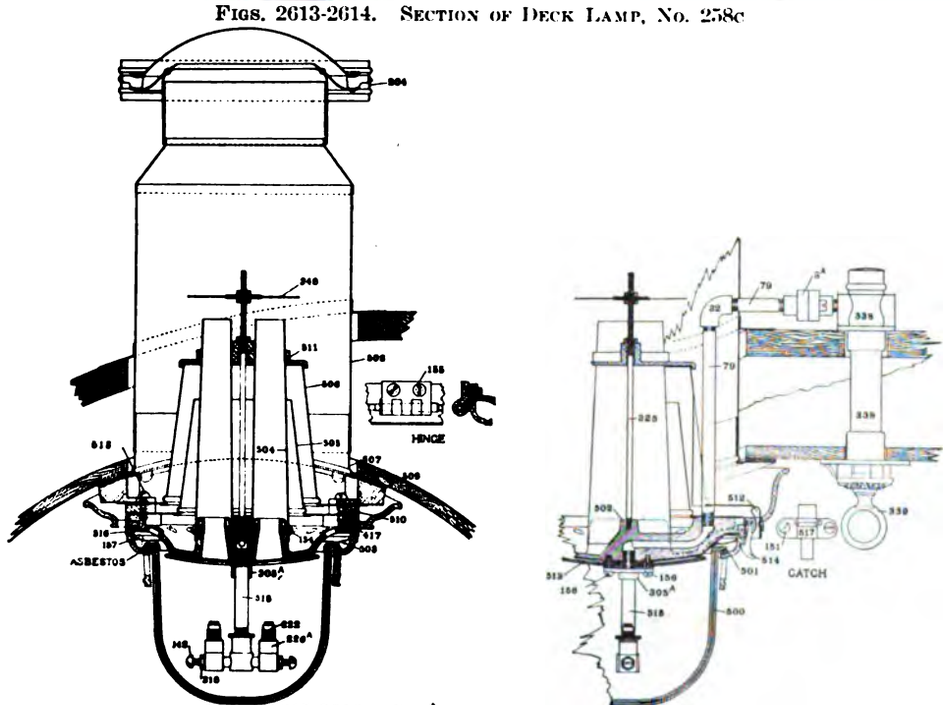


FIG. 2612. SECTION OF DECK LAMP, NO. 257c.



FIGS. 2613-2614. SECTION OF DECK LAMP, NO. 258c



FIGS. 2615-2616. SECTION OF DECK LAMP, NO. 253.

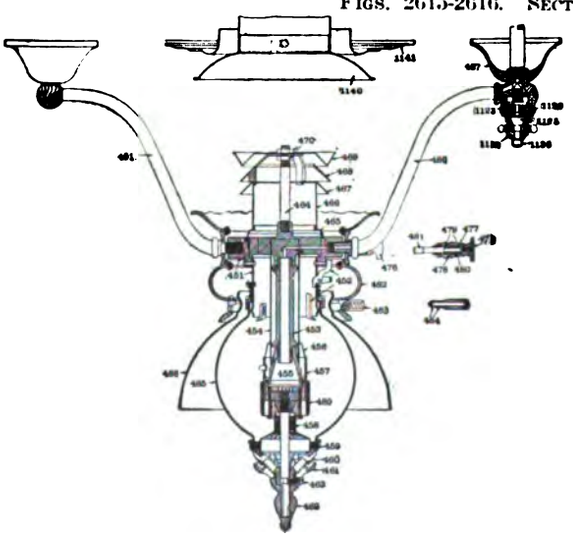


FIG. 2617. SECTION OF ARGAND LAMP, NO. 450.

LIST OF LAMP PARTS.
(SEE SECTIONS.)

CAT. NO	DESCRIPTION.
384.	*Spider Diaphragm*
385.	*Body Ring Diaphragm*
387.	*Air Controller*
389.	*Bracket for Fuse Block*
390.	*Double Diaphragm*
391.	*Flue*
392.	*Top Ring for Flues*
393.	*Extension Chimney*
394.	*Roof Thimble and Flue*
395.	*9 in Ventilator*
396.	*Spacing Pieces for Plain Bracket*
396a.	*Spacing Pieces for Switch Bracket*
397.	*Stem for Needle Valve*
398.	*Needle Valve Complete*
399.	*Thumb Piece and Socket*
400.	*Body Ring*
401.	*Inner Ring of Bezel*
402.	*Outer Ring for Bezel*
403.	*Spring for Catch*
404.	*Catch*
405.	*Plain Bracket*
406.	*Switch Bracket*
407.	*Bracket for Fuse Block*
408.	*Diaphragm*
409.	*Spacing Pieces*
409a.	*Spacing Pieces for Switch Bracket*
414.	*Clamp for Wire Cleat*
415.	*Screw for Wire Cleat*
416.	*Band for Body Ring*
417.	*Screw for Body Ring*
418.	*Cover for Switch*
419.	*Screw for Switch*
420.	*Screw for Ring Casting*
421.	*Screw for Fuse Block Bracket*

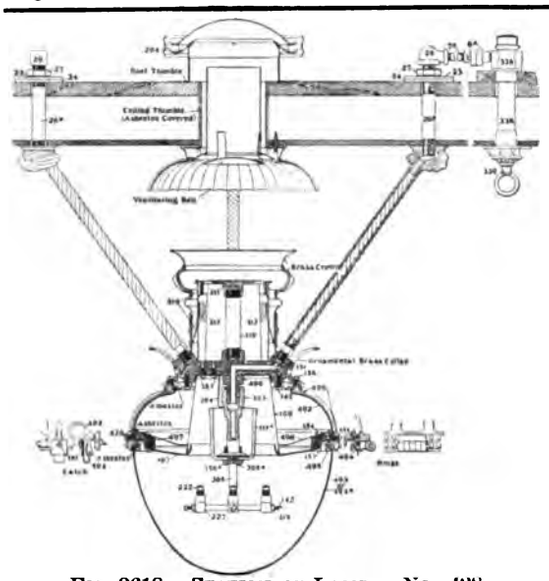


FIG. 2618. SECTION OF LAMP. No. 428.

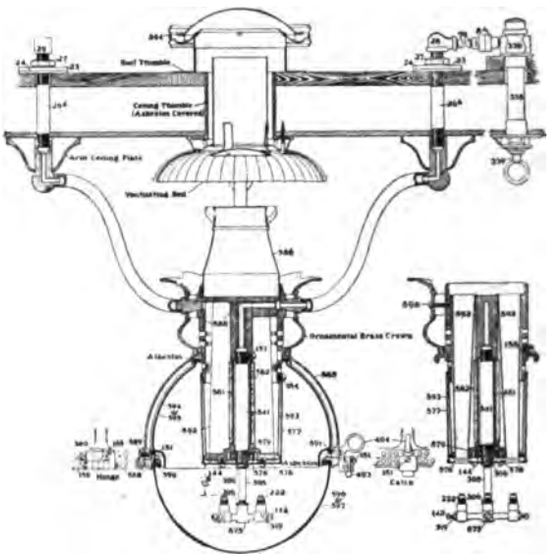
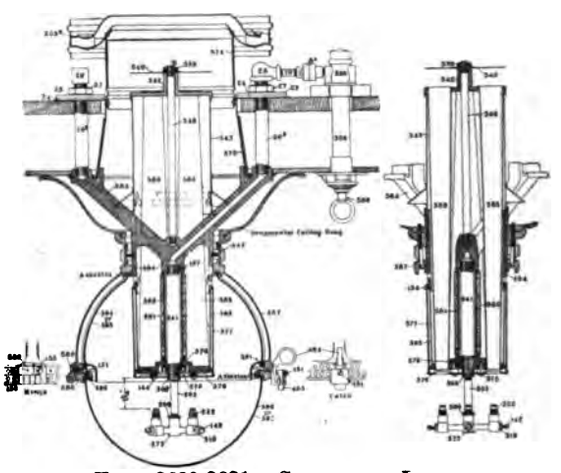


FIG. 2619. SECTION OF LAMP. No. 427.

LIST OF LAMP PARTS. (SEE SECTIONS.)

CAT. NO. DESCRIPTION.

451. *Gas Body*
452. *Globe Finger*
453. *Gas Nipple*
454. *Gas Nipple Cover*
455. *Burner, Complete*
456. *Upper Part of Air Deflector*
457. *Lower Part of Air Deflector*
458. *Air Controller*
459. *Injector Top*
460. *Injector Plate*
461. *Injector Bottom*
462. *Injector Knob*
463. *Injector Screw*
464. *Binding Rod*
465. *Base for Top of Flue*
466. *Top of Flue*
467. *Damper Plate*
468. *Ejector Spider*
469. *Wind Cap*
470. *Lock Nut*
476. *Globe Finger Pull*
477. *Cap for Globe Finger Pull*
478. *Spring Box, Globe Finger Pull*
479. *Washer for Globe Finger Pull*
480. *Spring for Globe Finger Pull*
481. *Pull Bolt for Globe Finger Pull*
482. *Ornamental Body*
483. *Shade Holder*
484. *Shade Holder Spring and Box*
485. *Six-inch Globe*
486. *Gas Arm with Valve, Complete*
487. *Ceiling Plate for Gas Arm*
488. *Nine-inch Opal Shade*
489. *Reflector*
491. *Plain Arm, Complete*
494. *Bezel*
495. *Spring Globe Ring*
496. *Frame for Dome*
497. *Ring Casting*
498. *Diaphragm*
499. *Body Casting*
501. *Bezel*
502. *Body Casting*
503. *Globe Holder Ring*
504. *Chimneys*
505. *Diaphragm*
506. *Shield*
507. *Lower Thimble*
508. *Roof Thimble*
509. *Bracket*
510. *Spacing Piece*
511. *Top Piece for Flues*
512. *Spring for Catch*
513. *Reflector*
514. *Catch*
515. *Cluster Stem*
516. *Band for Body Casting*



FIGS. 2620-2621. SECTION OF LAMP. No. 440.

CAT. NO. DESCRIPTION.

517. *Spring and Catch, Complete*
519. *Chimney*
525. *Top Ring for Flues*
529. *Burner*
533. *Shell for Burner*
539. *Lock Nut for Deflecting Plate*
540. *Deflecting Plate*
541. *Gas-Way Tube*
542. *Top Piece for Flues*
545. *Cover for Flues*
546. *Flue Post*
547. *Screw for Ornamental Body*
573. *Lower Thimble*
574. *Roof Thimble*
576a. *Flat Reflector, 2 Flame*
578. *Lock Nut for Gas-Way Tube*
579. *Reflector Flange*
580. *Body Casting*
581. *Spacing Piece*
582. *Asbestos Covering for Gas-Way*
583. *Flues*
584. *Body Casting*
585. *Frame for Dome*
586. *Extension Chimney*
587. *Frame for Dome*
588. *Bezel or Globe Ring with Hinge*
589. *Cover for Hinge*
590. *Spun Globe Holder*
591. *Dome Ring*

CAT. NO. DESCRIPTION.

592. *Flues*
593. *Cylinder*
598. *Screw for Crown*
1123. *Needle for Valve*
1125. *Stem and Cap for Valve*
1129. *Spring for Valve*
1132. *Wheel for Valve*
1136. *Nut for Valve*
1140. *Smoke Bell*
1141. *Smoke Bell Ceiling Plate*
4000. *Electric Switch, Single Pole*
4011. *Thumb Piece*
4012. *Asbestos Washer for Switch*
4013. *Fuse Block*
4014. *Screw for Fuse Block*
4015. *Fuse Block Cover*
4016. *Screw for Fuse Block Cover*
4017. *Asbestos Washer for Fuse Block*
4018. *Wire Cleat, Two Halves*
4019. *Incandescent Lamp Socket, Complete*
4020. *Asbestos Washer for Socket*
4021. *Screw for Socket*
4022. *Shell for Socket*
4023. *Base Complete*
4024. *Porcelain Ring*
4025. *Electric Bulb (Voltage and c p to be Specified)*
4030. *Asbestos Braided Tube*

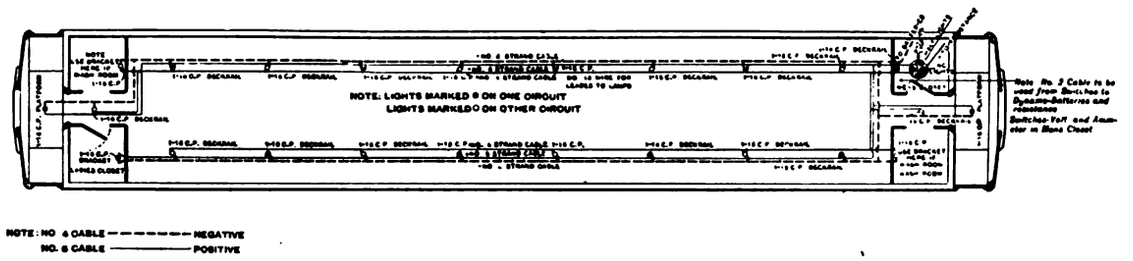


FIG. 2622. PLAN OF WIRING FOR THREE WIRE SYSTEM FOR ALTERNATE LIGHTS.

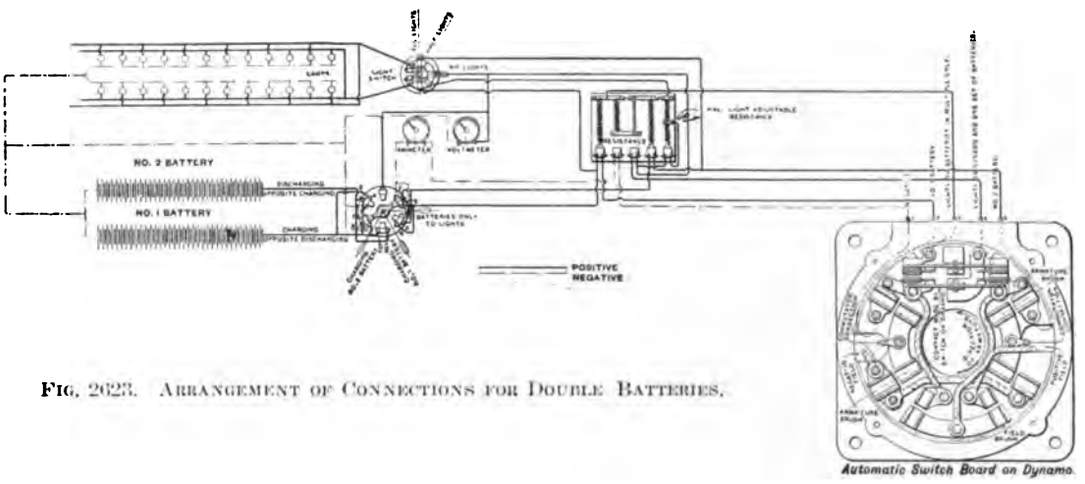
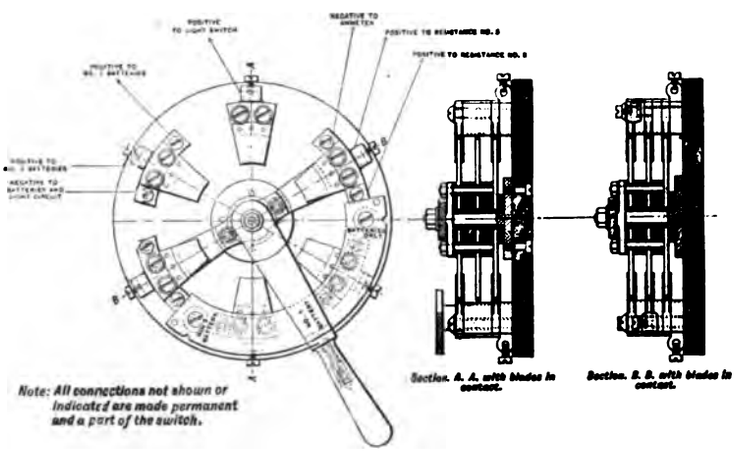
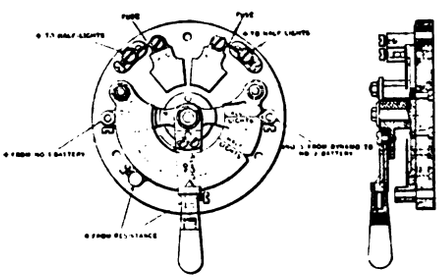


FIG. 2623. ARRANGEMENT OF CONNECTIONS FOR DOUBLE BATTERIES.


Note: All connections not shown or indicated are made permanent and a part of the switch.
Section. A. A. with blades in contact.
Section. B. B. with blades in contact.

FIGS. 2624-2626. THREE-WAY BATTERY SWITCH.



FIGS. 2627-2628. LIGHT SWITCH.

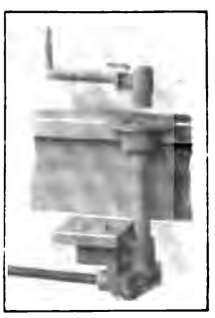


FIG. 2629. RATCHET WRENCH FOR ADJUSTING DYNAMOS AND CONNECTIONS.

FIGS. 2630-2635. ELECTRICAL INSTRUMENTS AND SWITCHES.

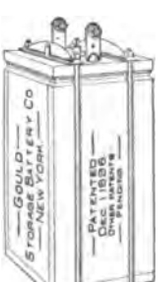


FIG. 2636. STORAGE BATTERY.

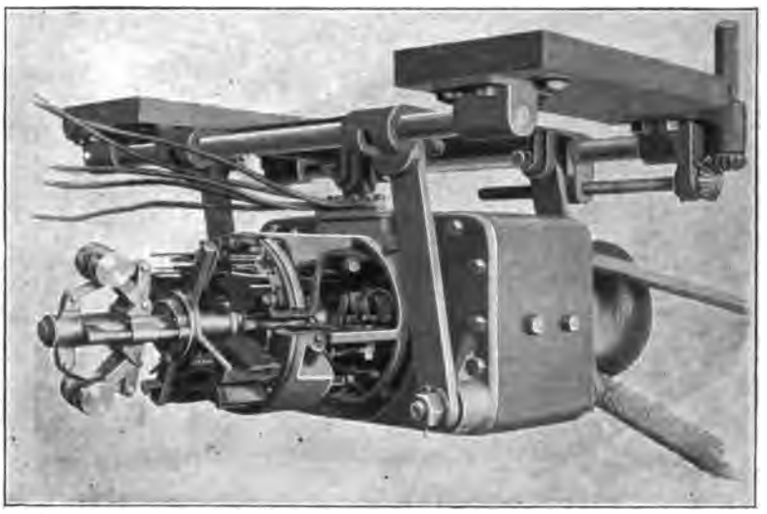
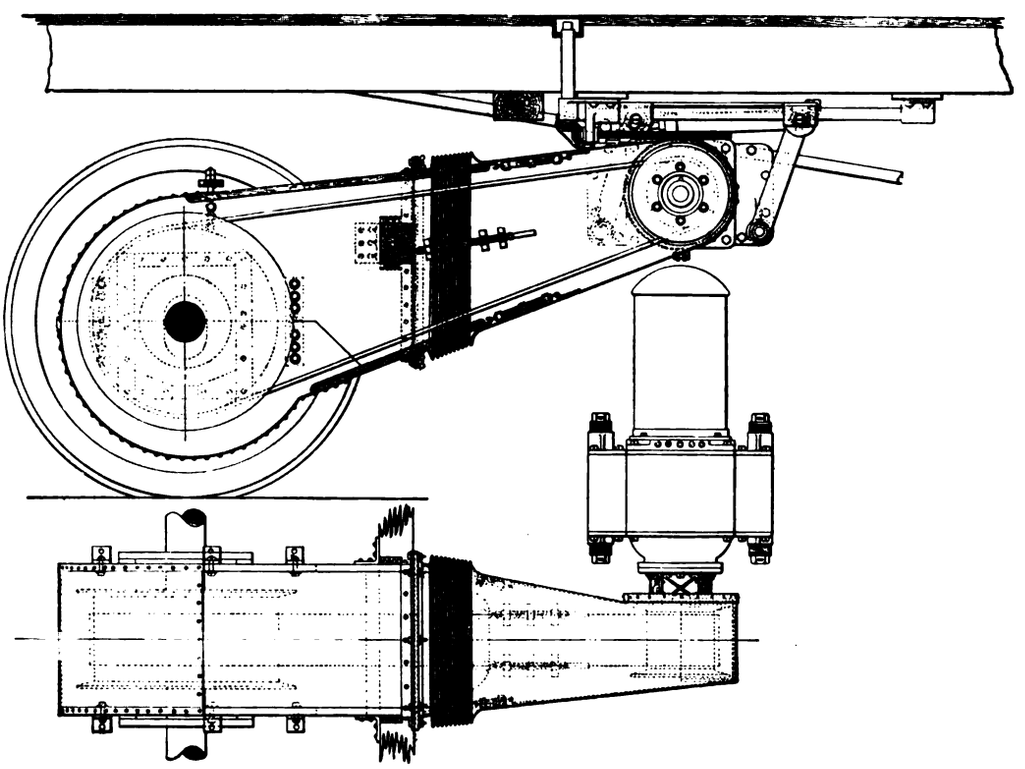


FIG. 2637. DYNAMO WITH COVER REMOVED, SHOWING AUTOMATIC SWITCH AND METHOD OF SUSPENSION.



FIGS. 2638-2639. APPLICATION OF DYNAMO WITH BELT SHIELD.

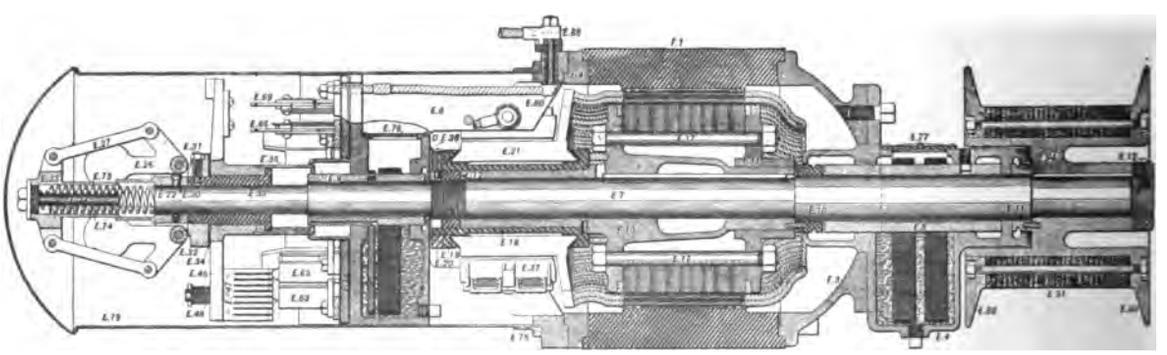


FIG. 2640. SECTION OF RAILROAD DYNAMO, TYPE F.

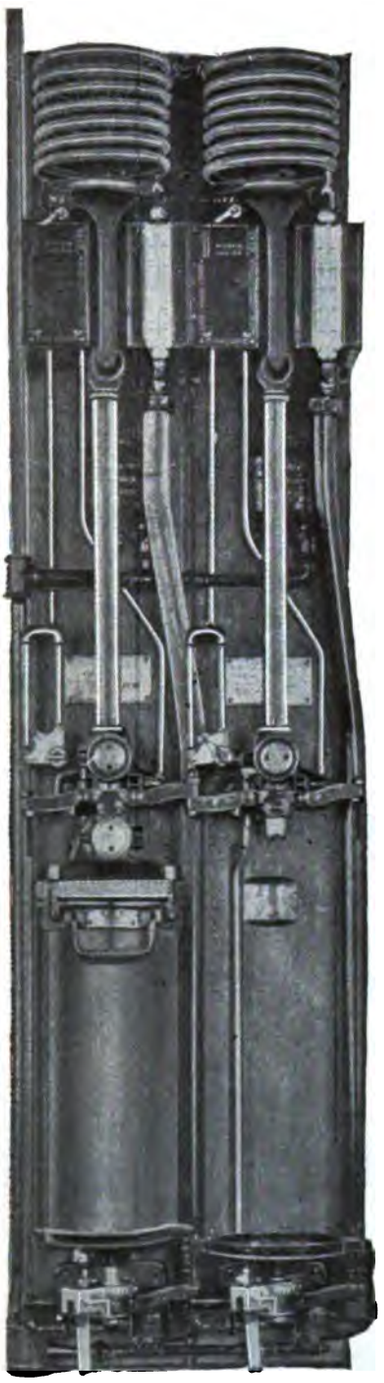


FIG. 2644.
TWO LIGHT CHANDELIER,
No. 752.

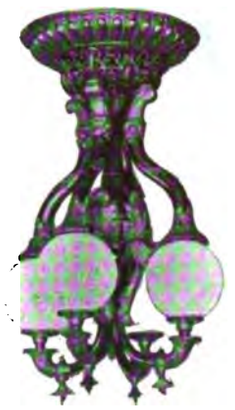


FIG. 2645.
FOUR LIGHT CHANDELIER,
No. 754.

FIGS. 2641-2642. GENERATING APPARATUS AND REMOVABLE CARTRIDGE.

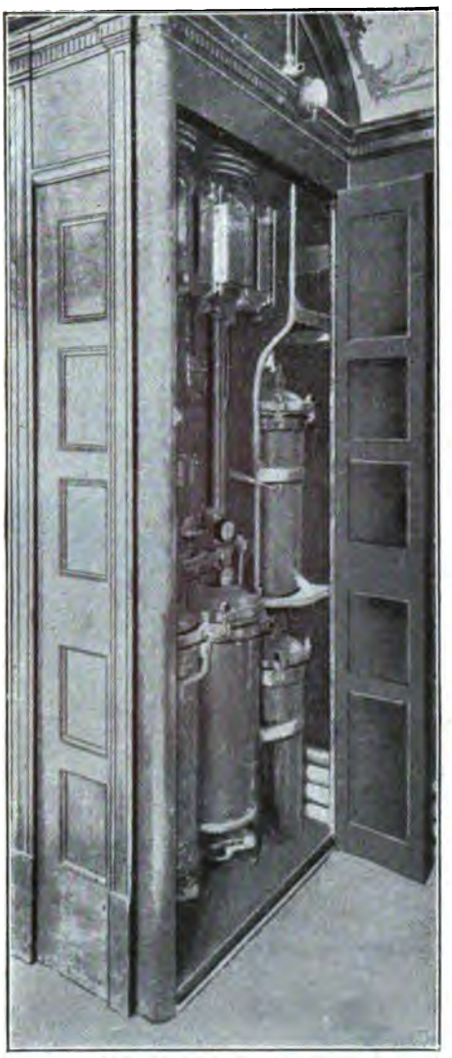


FIG. 2643.
VIEW SHOWING LOCATION OF GENERATOR IN
CLOSET AT END OF CAR.

FIG. 2646. VESTIBULE LAMP, No. 709.

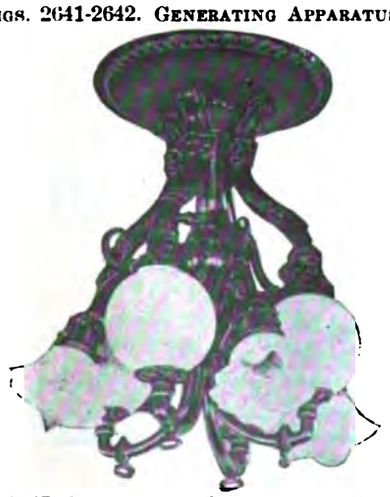


FIG. 2647. FOUR LIGHT COMBINATION GAS AND
ELECTRIC CHANDELIER, No. 747.

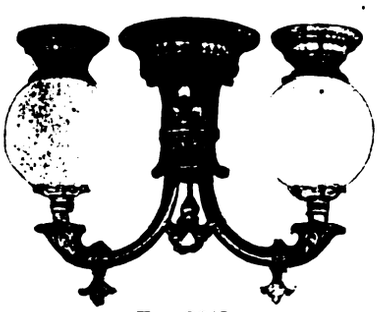


FIG. 2648.
TWO LIGHT CHANDELIER, No. 720.

FIG. 2649.
FOUR LIGHT IRON CHANDELIER.
No. 743.

FIG. 2650.
COMBINATION GAS AND ELECTRIC SIDE BRACKET LAMP. No. 723.

FIG. 2651.
PANEL LAMP FOR PASSAGE WAY. No. 766.

FIG. 2652.
OVAL PANEL LAMP, No. 732.

FIG. 2653.
SIDE BRACKET LAMP, No. 738.

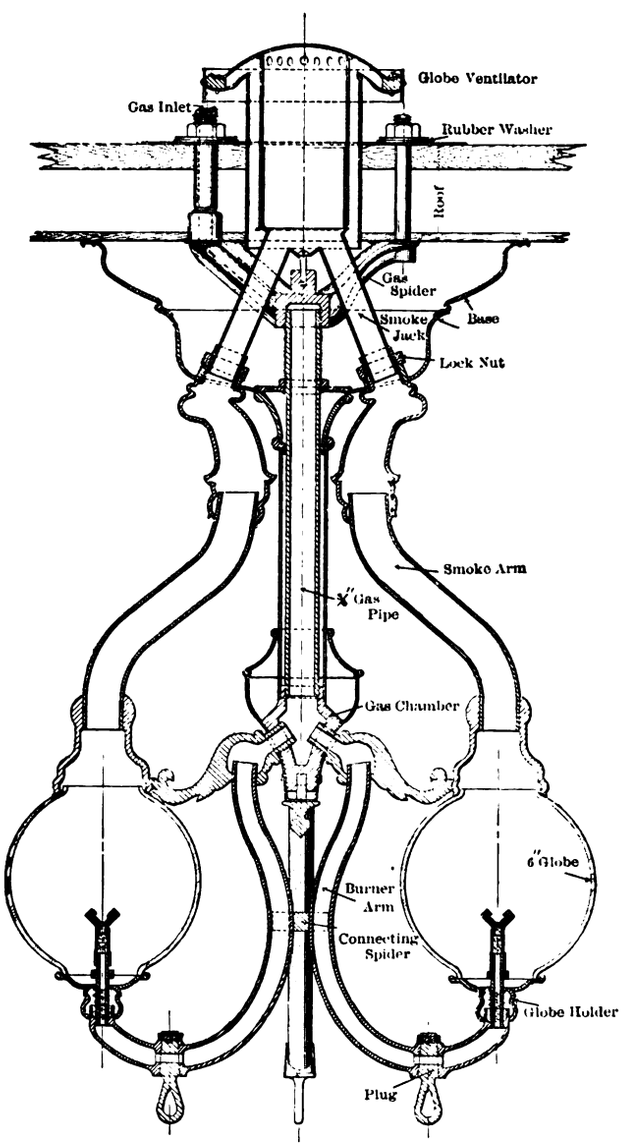


FIG 2654. SECTION OF LAMP BODY.

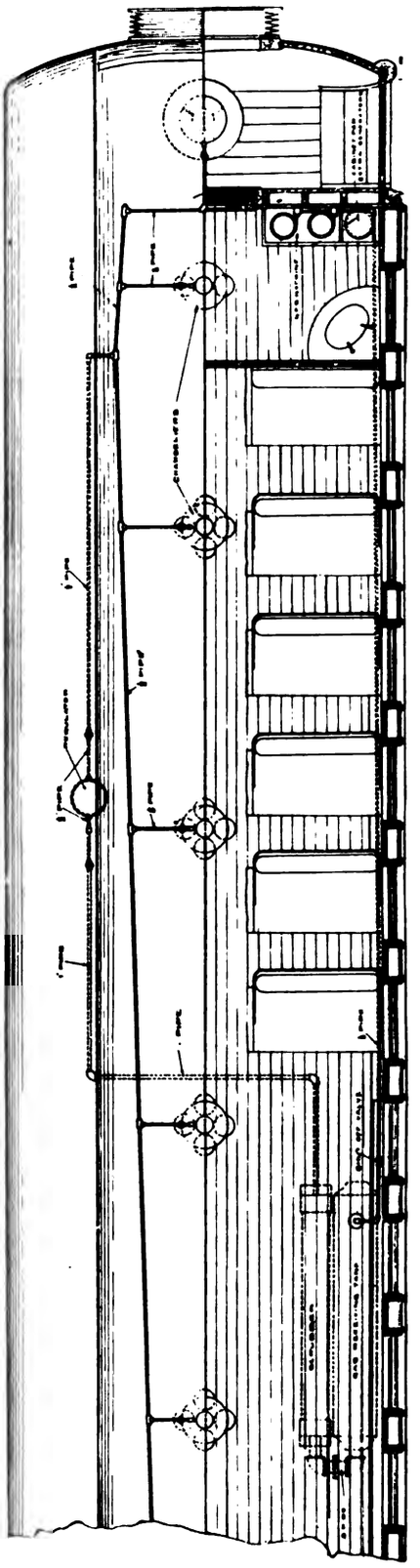


FIG. 2655.
PLAN OF PIPING OF CAR.

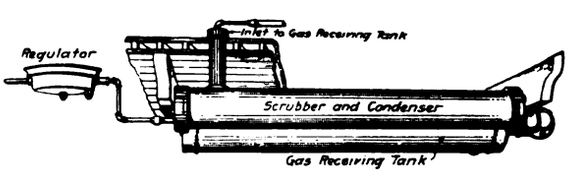
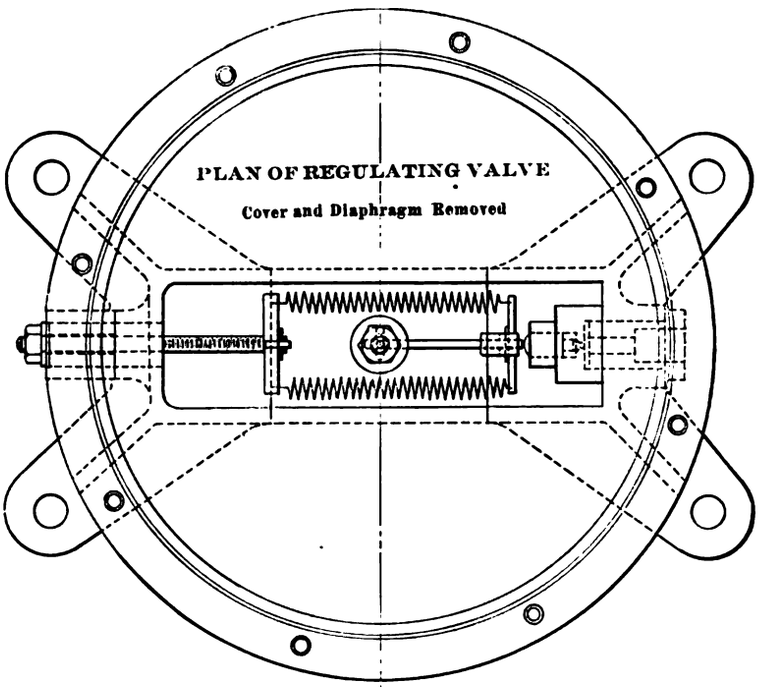
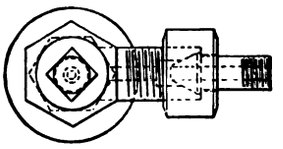
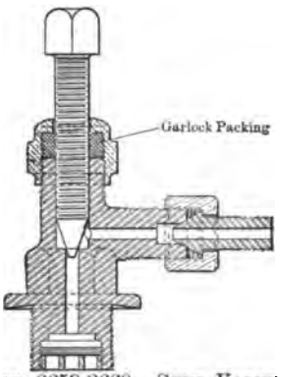


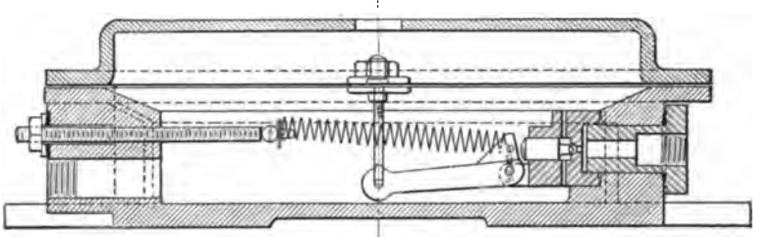
FIG. 2656.
ARRANGEMENT OF FIXTURES UNDER CAR.



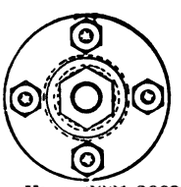


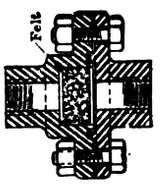


Figs. 2659-2660. Stud Valve.



Figs. 2657-2658. Pressure Regulating Valve.





Figs. 2661-2662. Filter Casing.

Commercial Acetylene Co.'s Storage System of Acetylene Gas Lighting.

Fig. 2663.
Diam. 6⅞ Ins.

Fig. 2664.
Diam. 6 Ins.

Fig. 2665.
Diam. 7 Ins.

Fig. 2666.
Diam. 4½ Ins.
Adjustable.

Fig. 2668.
Diam. 7¾ Ins.

Fig. 2669.
Diam. 9 Ins.
Kirby's Adjustable.

Fig. 2670.
Diam. 7⅛ Ins.

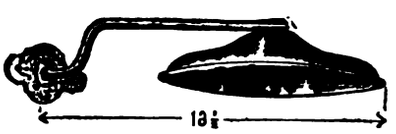


Fig. 2671.
Bracket Canopy.

Fig. 2672.
Sectional View.

Fig. 2673.
Diam. 5¾ Ins.

Lamp Canopies or Smoke Bells. Dayton Manufacturing Co.

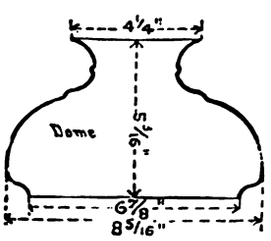


Fig. 2674
"Dome" Lamp Shade.

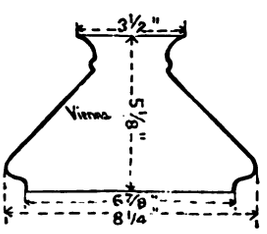


Fig. 2675.
"Vienna" Lamp Shade.

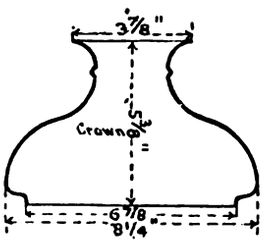


Fig. 2676.
"Crown" Lamp Shade.

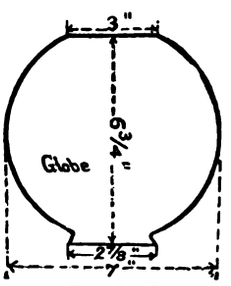


Fig. 2677.
"Globe" Lamp Shade
or Lamp Globe.

Standard Styles of Lamp Shades: Special Forms for Student and Other Lamps.

(The use of these Standards in the trade is general, but not universal.)

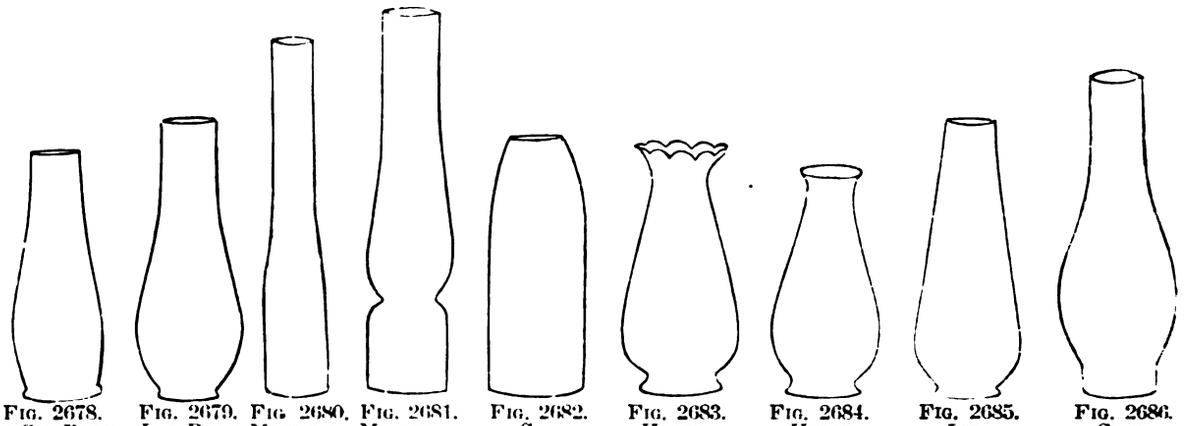


Fig. 2678. Lip Sm. Bulb (Dual). Fig. 2679. Lip Bulb (Dual). Fig. 2680. Moehring Argand. Fig. 2681. Mammoth. Fig. 2682. Sun. Fig. 2683. Hinge. (Crimp Top). Fig. 2684. Hinge. (Bell Top). Fig. 2685. Lip. (Gun Shape). Fig. 2686. Slip. (Dual).

Standard Styles of Lamp Chimneys.
(The use of these Standards in the trade is general, but not universal.)

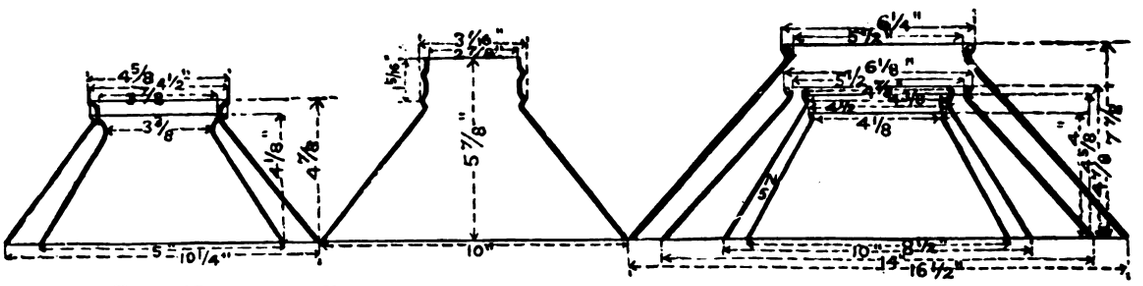


Fig. 2687. Fig. 2688. Cone Shades. Fig. 2689.

Standard Styles of Lamp Shades.
(The use of these Standards in the trade is general, but not universal.)

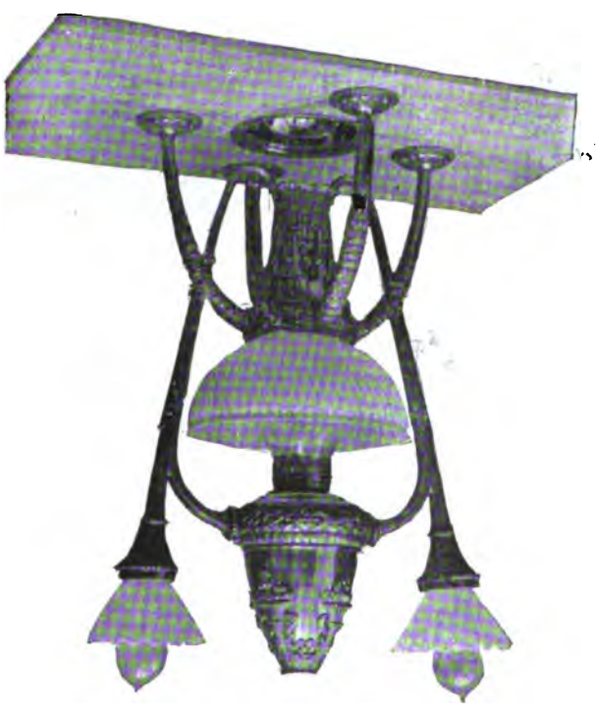


Fig. 2690.
Center Lamp and Electrolier Combined.

Fig. 2691. Center Lamp.
Drop, 22 Ins. Moehring Center Draft Burner.

Fig. 2692.
Side Candle Lamp.

Fig. 2693.
Electric Bracket Lamp.

FIG. 2694.
A DECORATED LAMP FOR DINING, PARLOR, SLEEPING AND FIRST-CLASS COACHES.

FIG. 2695.
A PLAIN LAMP FOR POSTAL, BAGGAGE, AND SUBURBAN CARS.

TWO-LIGHT OIL CHANDELIERS. STUDENT LAMP FRAMES, DROP 26 IN., ACME BURNERS. A. & W.

FIG. 2696. SIDE LAMP.

FIG. 2697.
EMERGENCY SIDE CANDLE LAMP. A. & W.

FIG. 2698.
SIDE LAMP AND ELECTROLIER.

FIG. 2699. SIDE LAMP.
WITH ACME BURNER.

FIG. 2700. MAIL CAR LAMP.
WITH SHADE AND ACME BURNER.
ADAMS & WESTLAKE CO.

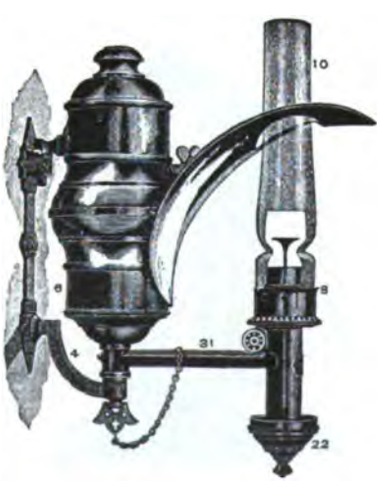


FIG. 2701. MAIL CAR LAMP.
WITH REFLECTOR AND ACME BURNER.

Fig. 2702.
Drop Over-all, 26 ins.
Acme Burner.

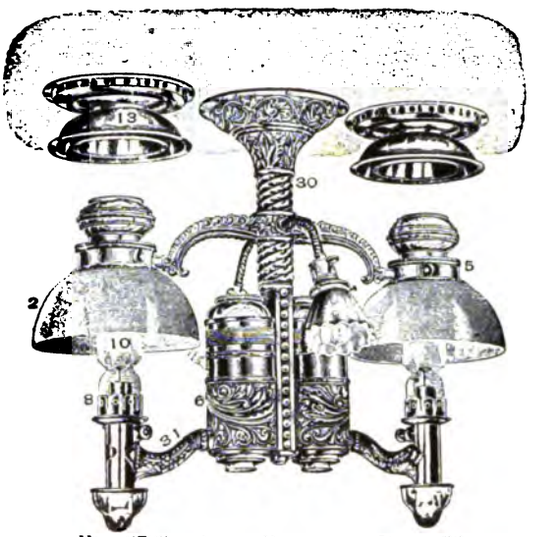


Fig. 2703. Acme Burners. Drop, 26 ins.
Center Lamps. Adams & Westlake Co.

Fig. 2704. Drop Over-all, 23 ins.
Acme Burner.

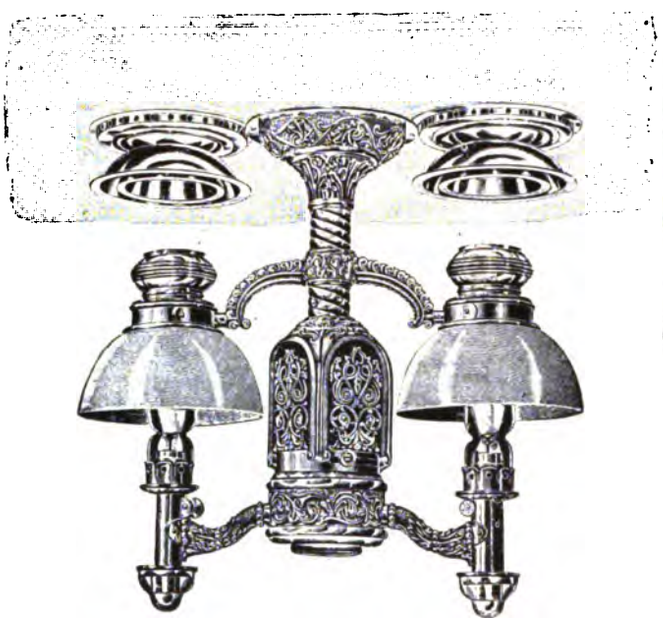


Fig. 2706. Single Fount. Drop, 26 ins.
Acme Burners.

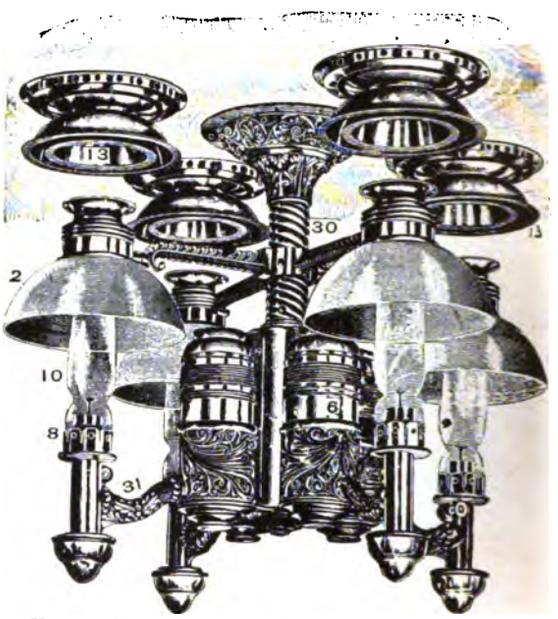


Fig. 2707. Four-Light Chandelier for Private, Dining and Parlor Cars.
Drop, 26 ins. With Acme Burner, Glass Drip Cups and Patent Combination Smoke Bell and Ventilator.
Center Lamps. Adams & Westlake Co.

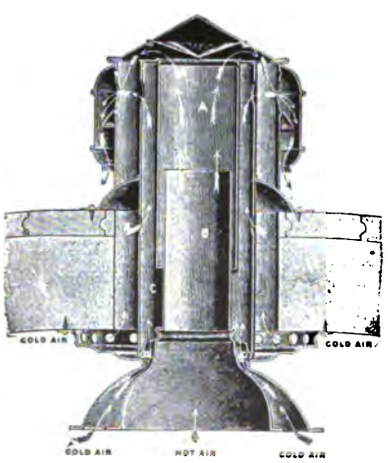
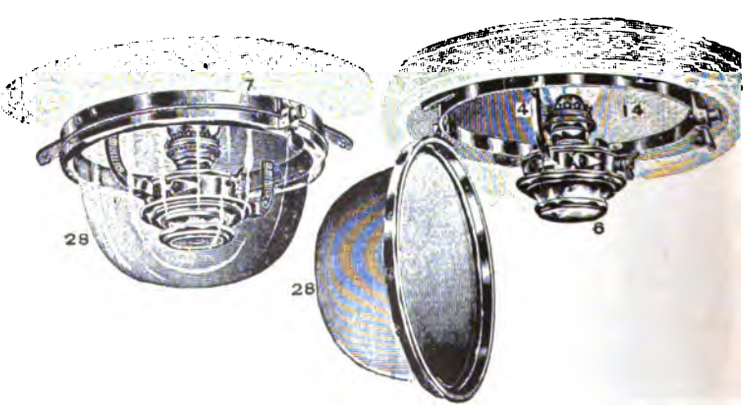


Fig. 2708. Improved Combination Smoke Bell and Ventilator.



Figs. 2709-2710. Vestibule Dome or Platform Lamp.
Diameter of Ring, 13 ins. Drop of Bowl, 7½ ins.
Adams & Westlake Co.

NAMES OF PARTS OF LAMPS. FIGS. 2694-2710.

1. *Lamp Stay*	7. *Globe Holder*	14. *Lamp Reflector*	21. *Candle Holder Cap*
2. *Lamp Shade*	8. *Lamp Burner*	15. *Lamp Chimney Reflector*	22. *Candle Holder Cup*
3. *Lamp Globe Chimney*	10. *Lamp Chimney*	16. *Side Lamp Holder*	28. *Lamp Globe*
4. *Lamp Arms*	11. *Lamp Chimney Holder*	17. *Side Lamp Bracket*	30. *Center Stay*
5. *Lamp Ring*	12. *Lamp Chimney Bracket*	18. *Side Lamp Braces*	31. *Feed Tube*
6. *Lamp Reservoir*	13. *Smoke Bell*	20. *Lamp Bottom*	33. *Shade Cap*

FIG. 2711. HINGED BRACKET.

FIG. 2712. HINGED BRACKET.

FIG. 2713. LAMP SOCKET.

FIG. 2714. PARTED BRACKET.

FIG. 2715. FLAT SOCKET. A. & W.

FIG. 2716. LAMP AND FLAG HOLDER. A. & W.

FIG. 2717. CORNER LAMP AND FLAG HOLDER.

FIG. 2718. PROJECTING SOCKET HOLDER.

FIG. 2719. LAMP BRACKET, ADJUSTABLE. A. & W.

FIG. 2720. PARTED LAMP BRACKET A. & W.

FIG. 2721. SOLID BRACKET. A. & W.

FIG. 2722. TOP SUPPORT BRACKET. A. & W.

FIG. 2723. SET SCREW BRACKET. A. & W.

FIG. 2724. CORNER SOCKET. A. & W.

FIG. 2725. CORNER SOCKET.

LAMP AND FLAG HOLDERS, BRACKETS AND SOCKETS.

FIG. 2726. ENGINE LAMP WITH TWO LENSES.

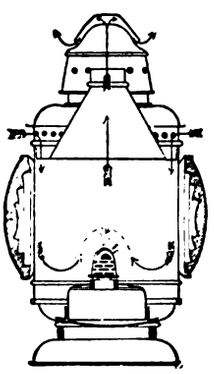


FIG. 2727. UPPER DRAFT VENTILATED TAIL LAMP.

FIG. 2728. COACH TAIL LAMP WITH THREE OR FOUR LENSES.

FIG. 2729. CABOOSE TAIL LAMP.

FIGS. 2730-2731. MANNER OF TAKING A. & W. LANTERN APART.

FIG. 2732. THE GIANT LANTERN.

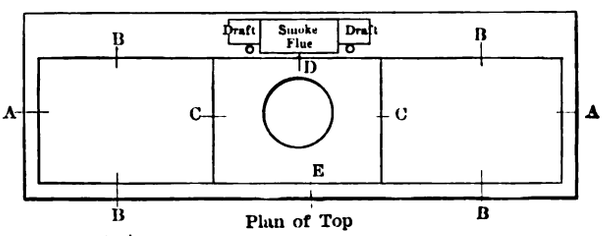
FIG. 2733. "ROCK ISLAND" PATTERN.

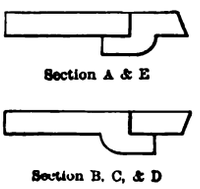
FIG. 2734. THE ADAMS LANTERN. TWISTED STEEL EARS.

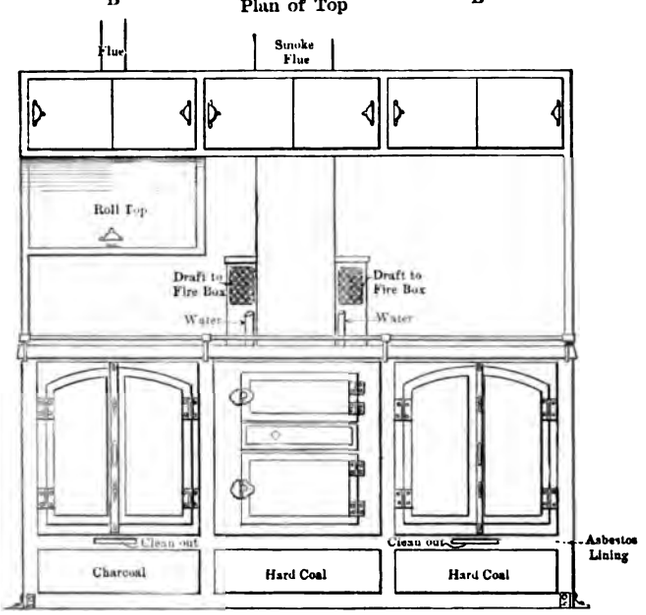
FIG. 2735. "PENNSYLVANIA" PATTERN. RAILROAD LANTERNS.

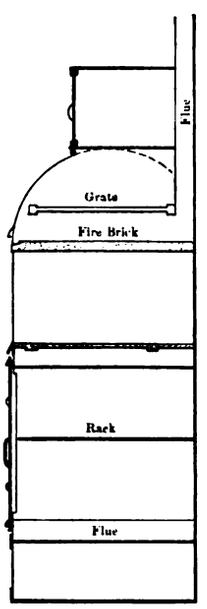
FIG. 2736. THE "PULLMAN" PATTERN. ADAMS & WESTLAKE CO.

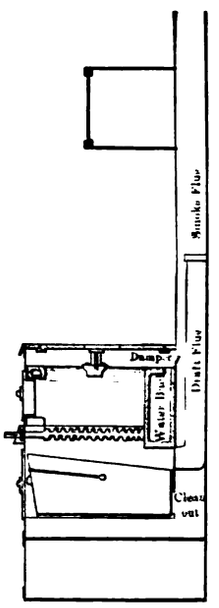
FIG. 2737 STEAMBOAT LANTERN.











FIGS. 2738-2743. STEARNS SAFETY CAR RANGE FOR DINING CARS. STEARNS STEEL RANGE CO.

FIG. 2744. GAS BROILER. NO. 1500.

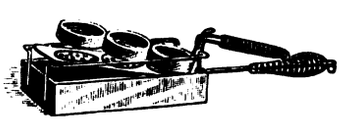


FIG. 2745. EGG POACHER. NO. 1504.

FIG. 2747. HASH BROWNER. NO. 1504.

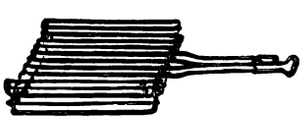


FIG. 2746. BROILING IRON. NO. 1502.

FIG. 2748. FRYING PAN. NO. 1503.

PINTSCH GAS BROILER AND UTENSILS. SAFETY CAR HEATING AND LIGHTING CO.

FIG. 2749. BASIN BUSHING AND PLUG FOR OVERFLOW BOWL. A. & W.

FIG. 2750. SINK BUSHING AND PLUG. A. & W.

FIG. 2751. BASIN BUSHING AND PLUG. A. & W.

FIG. 2752. TAIL COUPLING FOR ALCOVE FAUCET. A. & W.

FIG. 2753. TUMBLER HOLDER AND DRIP. A. & W.

FIG. 2754. DRIP COUPLINGS. A. & W.

FIG. 2755. WATER COOLER DRIP AND CONNECTIONS. A. & W.

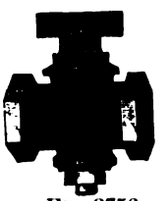


FIG. 2756. D. M. CO. STOP COCKS.

FIG. 2757. D. M. Co.

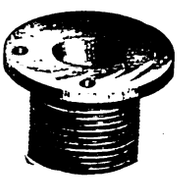


FIG. 2758. SPUD. D. M. Co.

FIG. 2759. SPUD AND COUPLING. D. M. Co.

FIG. 2760. TANK WASTE COCK. A. & W.

FIG. 2761. SPIDER. D. M. Co.

FIG. 2762. WRENCH. A. & W.

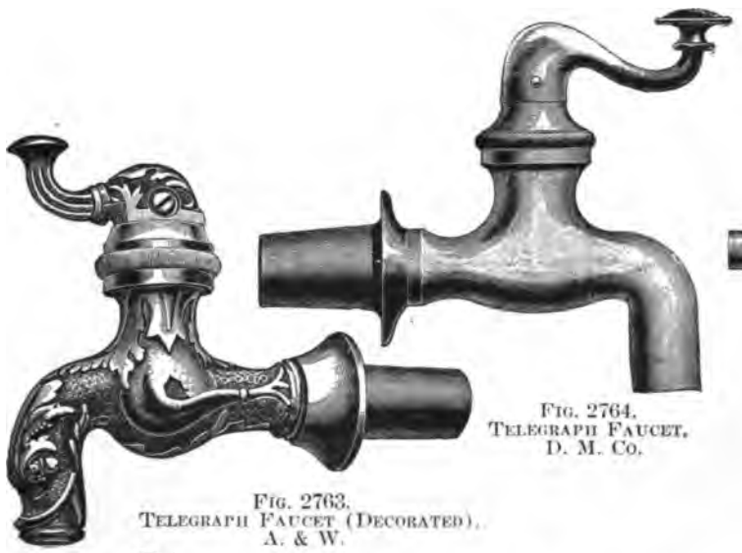


FIG. 2763. TELEGRAPH FAUCET (DECORATED). A. & W.

FIG. 2764. TELEGRAPH FAUCET. D. M. Co.

FIG. 2765. BIBB COCK. D. M. Co.

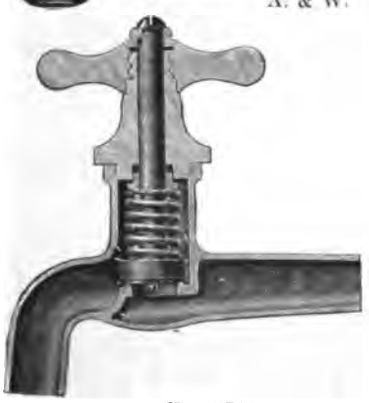


FIG. 2766. ZANE'S SELF CLOSING BIBB COCK. D. M. Co.

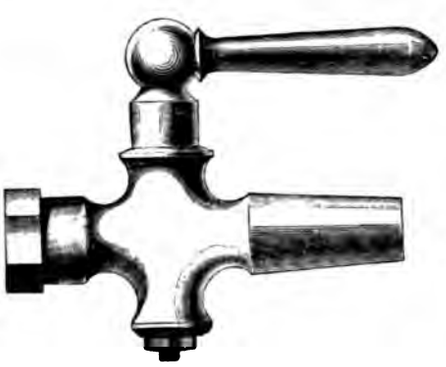


FIG. 2767. STOP COCK. D. M. Co.

FIG. 2768. HITCHCOCK'S COMBINATION HOT AND COLD WATER FAUCETS. A. & W.

FIG. 2769. COMPRESSION FAUCET. A. & W.

FIG. 2770. CHAIN POST OR STAY. A. & W.

FIG. 2771. SOAP DISH. CENTER TO CENTER OF BOLTS, 5 INS. A. & W.

FIG. 2772. SOAP DISH. A. & W.

FIG. 2773. SOAP DISH. 4½ INS. IN DIAMETER. A. & W.

FIG. 2774. SOAP DISH. SIZE, 3⅝ x 4⅝ INS. A. & W.

FIG. 2775. SOAP DISH. SIZE, 3⅝ x 4⅝ INS. A. & W.

FIG. 2776. SOAP DISH.

FIG. 2777. TUMBLER HOLDER. A. & W.

FIG. 2778. TUMBLER HOLDER. A. & W.

FIG. 2779.

FIG. 2780.

FIG. 2781.

FIG. 2782.

TUMBLER HOLDERS. A. & W.

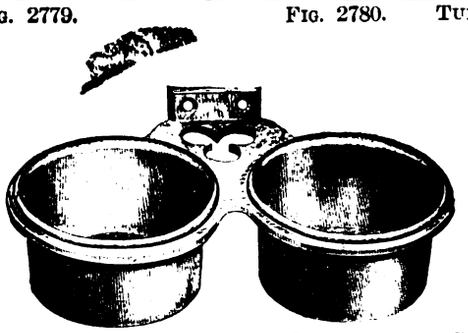


FIG. 2783. DOUBLE TUMBLER HOLDER. D. M. CO.

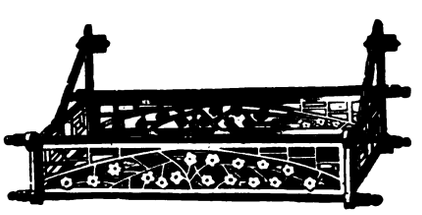


FIG. 2784. COMB AND BRUSH RACK. A. & W.

Fig. 2785. Comb and Brush Case.
A. & W.

Fig. 2786. Comb and Brush Case.
A. & W.

Fig. 2788.
Bottle Bracket
D. M. Co.

Fig. 2787. Comb and Brush Case.

Fig. 2789. Cuff Rack. A. & W.

Fig. 2790.
Towel, Comb and Brush Rack.
A. & W.

Fig. 2791. Comb and Brush Case.
A. & W.

Fig. 2793.
Comb and Brush Rack.
D. M. Co.

Fig. 2792.
Comb and Brush Rack.
A. & W.

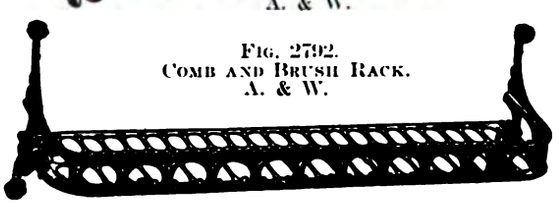
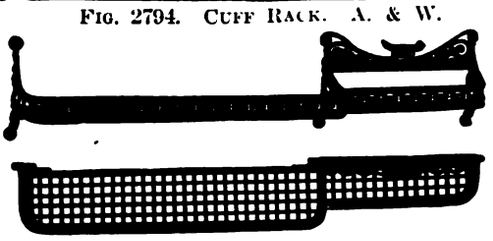


Fig. 2794. Cuff Rack. A. & W.



Figs. 2795-2796. Towel, Comb and Brush Rack.
A. & W.

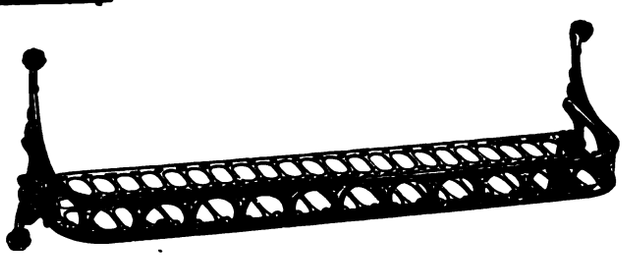


Fig. 2797. Towel Rack. A. & W.

Fig. 2798.
Wash Bowl, Fittings and Water Cooler.

Names of Parts. Figs.

1. *Bowl or Basin*
2. *Slab*
3. *Riser*
4. *Compression Faucet*
5. *Basin Valve*
6. *Combination Hot and Cold Water Faucets (A. & W.)*
7. *Soap Dish*
9. *Supply Pipe to Compression Faucet*
10. *Wash Basin Drain*
11. *Supply Pipe, Hot Water*
12. *Supply Pipe, Cold Water*
13. *Tumbler Holder Drain*
14. *Water Cooler*
15. *Water Cooler Faucet*

Fig. 2799. Wash Bowl and Fittings.

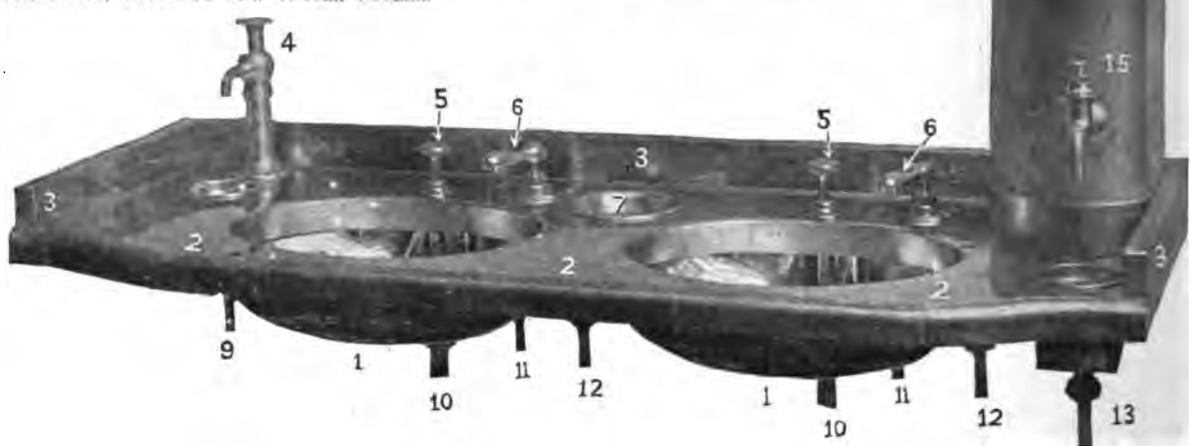


Fig. 2800. Double Wash Bowl, Fittings and Water Cooler. Made of White Metal.
Adams & Westlake Co.

Fig. 2801.
Combination Hot and Cold Water Faucet. A. & W.

Fig. 2802.
General View.

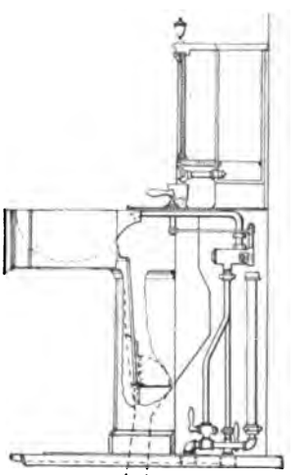


Fig. 2803.
Sectional Side Elevation.

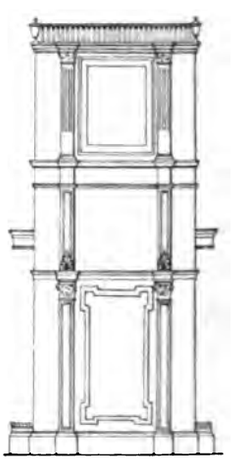


Fig. 2804.
Front Elevation.

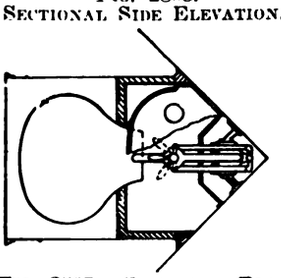


Fig. 2805. Sectional Plan.
Folding Wash Stand for Staterooms. A. & W.

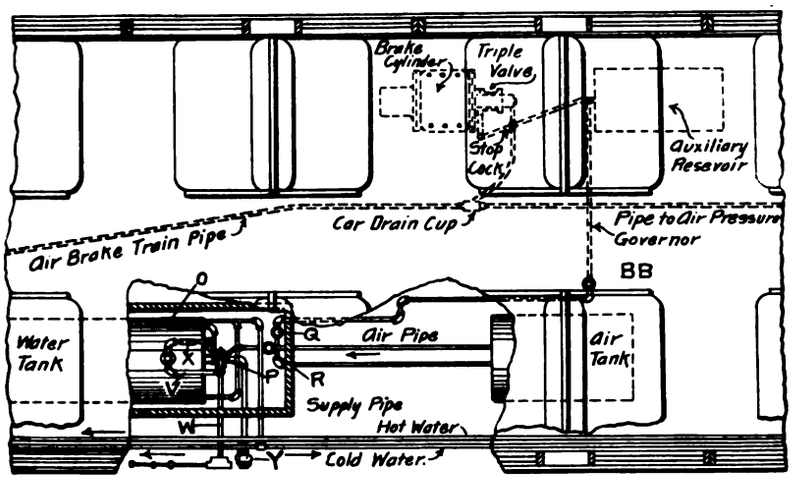


FIG. 2806. PART SECTIONAL PLAN SHOWING PIPING AND CONNECTIONS BETWEEN AIR TANK AND WATER TANK.

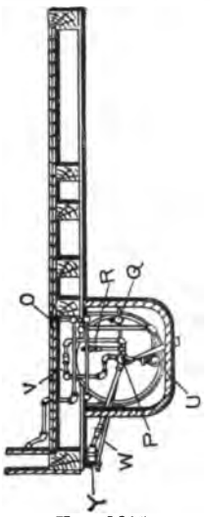


FIG. 2808. END ELEVATION.

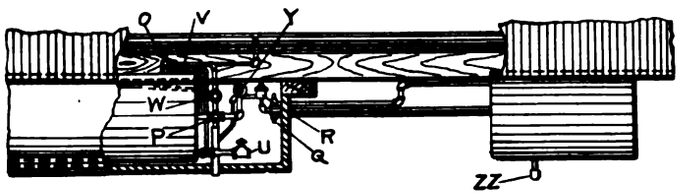


FIG. 2807. PART SECTIONAL ELEVATION SHOWING CONNECTIONS AND PIPING BETWEEN AIR TANK AND WATER TANK.

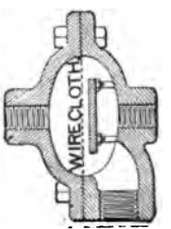


FIG. 2809. SECTION OF WATER SCREEN.

NAMES OF PARTS OF PULLMAN WATER SUPPLY FIGS. 2806-2813.

- **A.** *Shut Off Cock in Supply Pipe*
- **AA.** *Shut Off Cock to Hand Pump*
- **B.** *Stop and Waste Cock for Hoppers*
- **BB.** *Air Strainer and Drip Cup*
- **C.** *Stop Cock to Wash Bowl*
- **D.** *Stop Cock to Faucets*
- **E.** *Stop Cock to Fire Hose*
- **G.** *Stop Cock to Wash Bowl*
- **H.** *Shut Off Valve to Hot Water Coil*
- **I.** *Check Valve in Supply Pipe*
- **K.** *Globe Valve in Hot Water Supply Pipe*
- **L.** *Drip Stop Cock*
- **M.** *Safety Plug*
- **N.** *Hot Water Boiler*
- **O.** *Main Shut Off Cock*
- **P.** *Three Way Valve*
- **Q.** *Air Pressure Valve or Governor*
- **R.** *Reducing Valve*
- **S.** *Check Valve in Hand Pump Pipe*
- **T.** *Water Strainer or Screen*
- **U.** *Waste Pipe and Valve*
- **V.** *Air Vent from Water Tank*
- **W.** *Stem of Valve P*
- **X.** *Check Valve in Air Pressure Pipe*
- **Y.** *Tank Filler*
- **ZZ.** *Drip Cock in Air Tank*
- **Z.** *Blow Off Valve, to Cleanse Strainer T*

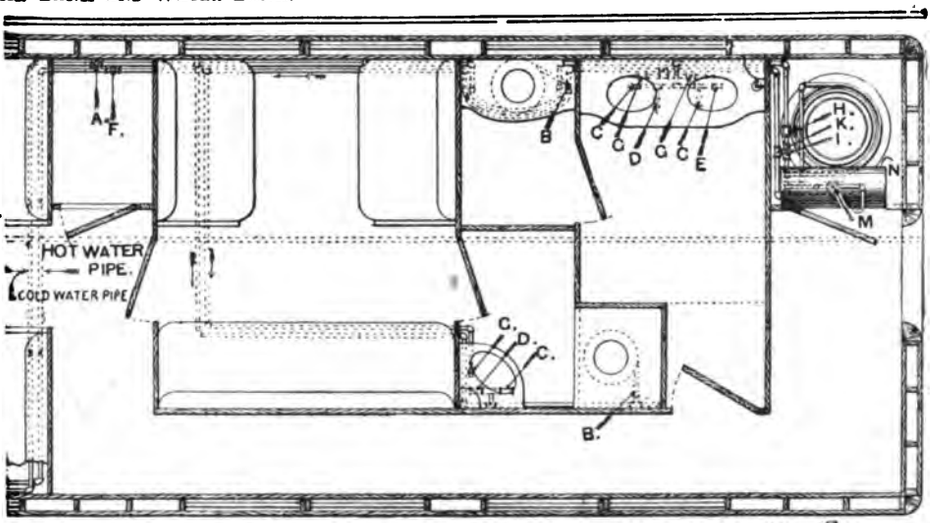


FIG. 2810. PART SECTIONAL PLAN, SHOWING PIPING AND CONNECTION BETWEEN AIR TANK, HEATER, STORAGE TANK AND LAVATORIES.

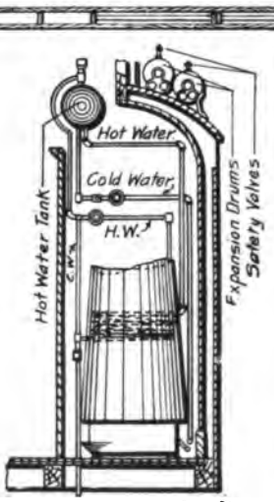


FIG. 2811. SECTIONAL VIEW OF HEATER AND PIPING.

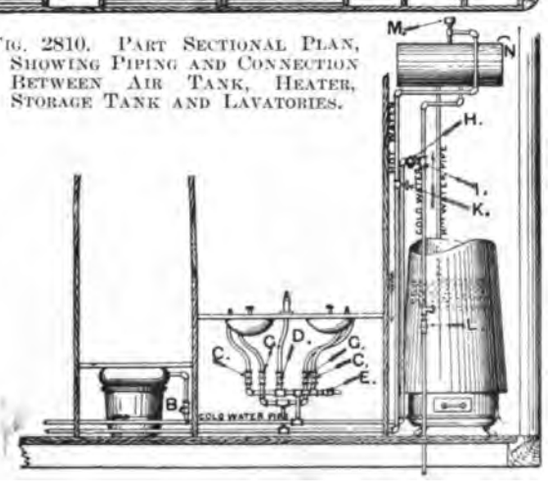


FIG. 2812. SECTIONAL ELEVATION OF PIPING AND CONNECTIONS BETWEEN HEATER, LAVATORY AND CLOSET.

PULLMAN SYSTEM OF WATER SUPPLY FOR LAVATORIES AND CLOSETS.

Hot and Cold Waters Are Under Pressure of Compressed Air.

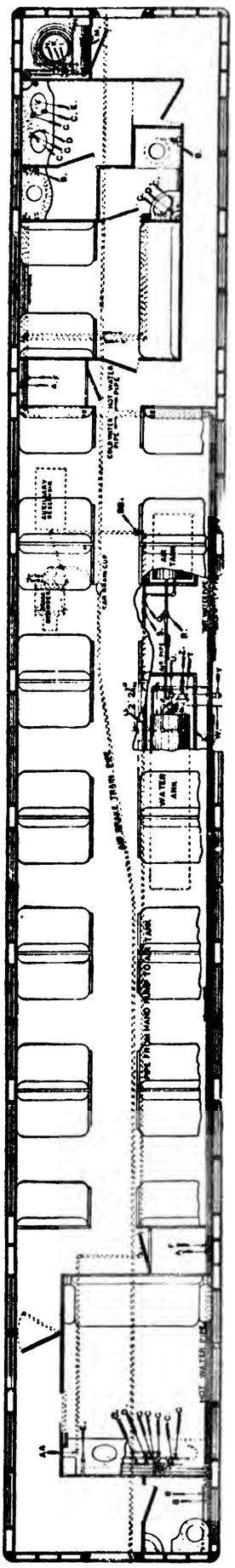
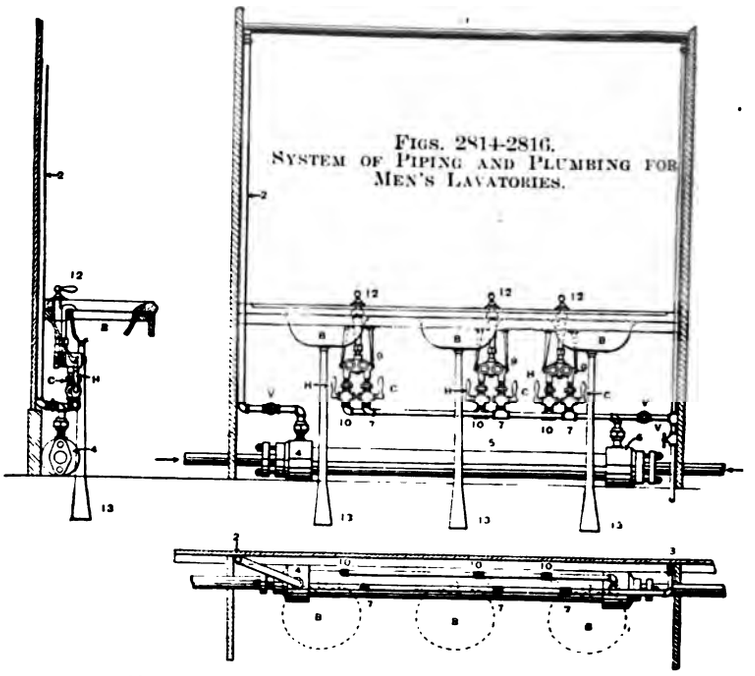


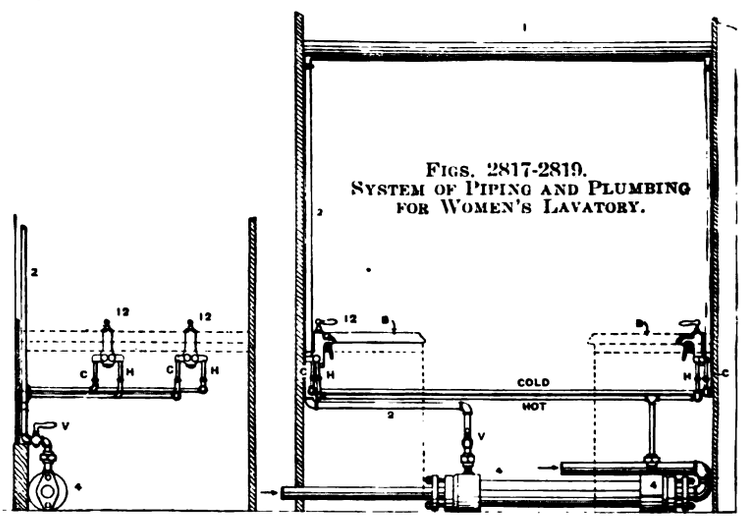
FIG. 2813. PULLMAN SYSTEM OF WATER SUPPLY FOR LAVATORIES AND CLOSETS.
Hot and Cold Waters Are Under Pressure of Compressed Air.



FIGS. 2814-2816.
SYSTEM OF PIPING AND PLUMBING FOR MEN'S LAVATORIES.

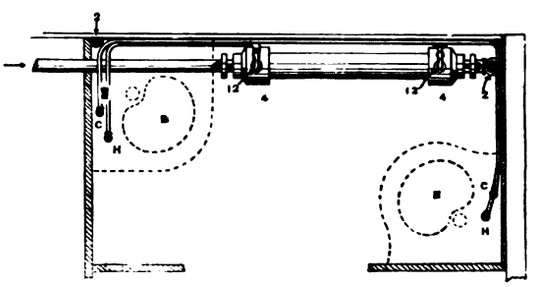
NAMES OF PARTS. FIGS. 2814-2819.

1. *Reservoir*
2. *Feed Water Pipe for Hot Water*
3. *Feed Pipe for Cold Water*
4. *Hot Water Jacket, Ends*
5. *Hot Water Jacket*
6. *Hot Water Pipe*
7. *Cold Water Connections*
9. *Water Cask Bracket*
10. *Hot Water Connections*
12. *Hot and Cold Water Cock*
13. *Bowl Waste Pipe*
B. *Bowl*
C. *Cold Water Connections*
H. *Hot Water Connections*
V. *Stop Cocks*



FIGS. 2817-2819.
SYSTEM OF PIPING AND PLUMBING FOR WOMEN'S LAVATORY.

FIG. 2820.
SWING NOZZLE FAUCET.



PULLMAN'S SYSTEM OF WATER SUPPLY FOR LAVATORIES AND CLOSETS.

Hot and Cold Waters Are Under Pressure of Compressed Air.

FIG. 2821. WATER ALCOVES. FIGS. 2822.

FIGS. 2823-2824. WATER ALCOVES. J. L. HOWARD CO.

FIG. 2825. TOWEL RODS AND BRACKET. D. M. CO.

FIG. 2826. CURTAIN ROD BRACKET. D. M. CO.

FIG. 2827. CURTAIN ROD BRACKET. A. & W.

FIG. 2828. WINDOW ROD BRACKET. A. & W.

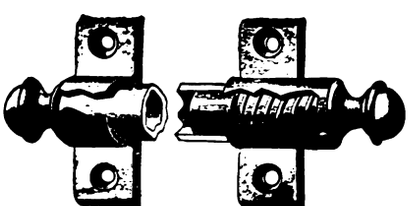


FIG. 2829. TOWEL ROD BRACKET. D. M. CO.

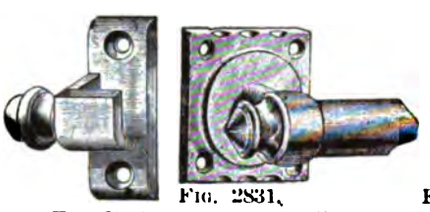


FIG. 2830 TOWEL ROD BRACKET. D. M. CO.

FIG. 2831.

FIG. 2832. CURTAIN ROD BRACKETS. D. M. CO.

FIG. 2833.

FIG. 2834. A. & W.

FIG. 2835. A. & W.

FIG. 2836. D. M. CO. WINDOW ROD BRACKETS.

FIG. 2837. A. & W.

FIG. 2838. A. & W.

FIG. 2839.

FIG. 2840.

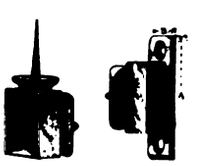
FIG. 2841.

FIG. 2842. TOWEL ROLLER BRACKETS. A. & W.

FIG. 2843. WINDOW ROD BRACKETS. FIG. 2844. A. & W.

FIGS. 2845-2848. CURTAIN RINGS. D. M. CO.

FIGS. 2849-2851. CURTAIN ROD BUSHINGS. D. M. CO.



FIGS. 2852-2853. CURTAIN ROD BRACKETS. D. M. CO.

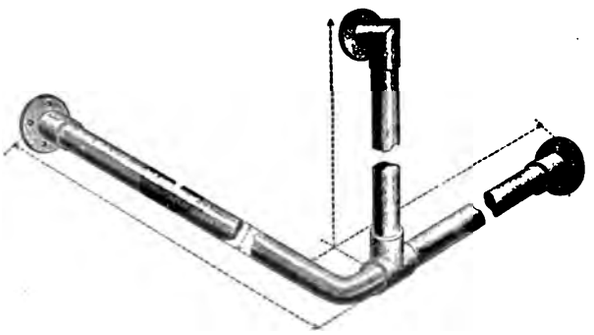
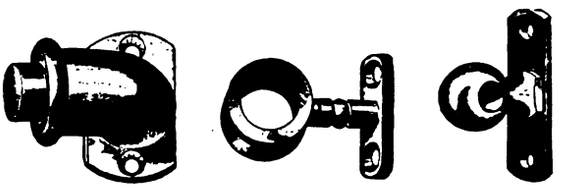


FIG. 2854. SECTION CURTAIN ROD. A. & W.



FIGS. 2855-2857. WINDOW ROD BRACKETS. A. & W.

FIGS. 2858-2859. TOWEL RODS. A. & W.

FIG. 2860. WINDOW GUARD ROD BRACKET. A. & W.

FIG. 2861.

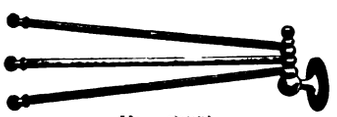
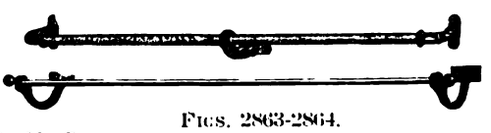


FIG. 2862. TOWEL RACKS AND RODS. D. M. CO.



FIGS. 2863-2864.

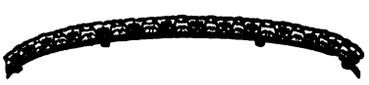
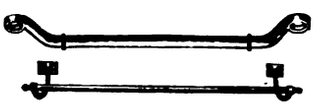


FIG. 2865. A. & W. RAILINGS FOR TOILET RACKS.

FIG. 2866. D. M. CO.



FIGS. 2867-2868. TOWEL RODS. A. & W.

FIGS. 2869-2873. CURTAIN CORD HOOKS. A. & W.

FIG. 2874. CUP HOOK.

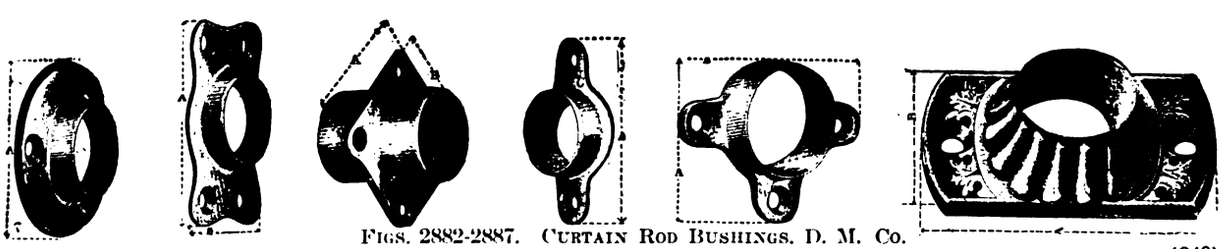
FIGS. 2875-2876. CURTAIN ROD BUSHINGS. D. M. CO.

FIGS. 2877-2878. FOOT REST ROD BRACKETS. A. & W.

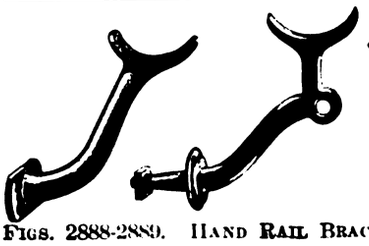
FIG. 2879. CURTAIN ROD BRACKET. A. & W.

FIG. 2880. WINDOW ROD BRACKET.

FIG. 2881. WINDOW ROD BRACKET. A. & W.

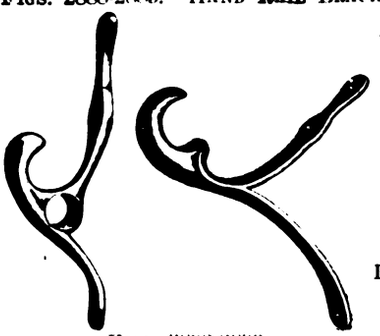


FIGS. 2882-2887. CURTAIN ROD BUSHINGS. D. M. CO.

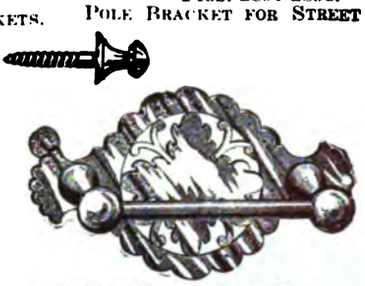


Figs. 2888-2889. Hand Rail Brackets.

Figs. 2890-2891.
Pole Bracket for Street Cars.



Figs. 2892-2893.
Pole Bracket for Street Cars.



Figs. 2894-2895. Drawer Pull.
D. M. Co.

Fig. 2906. Hand Rod Bracket.

Figs. 2907-2910.
Pole or Hand Straps.

Figs. 2896-2905. Upholsterers' Nails and Buttons.

Fig. 2911.
Grille for Vestibule Door.

Fig. 2912.
Grille for Vestibule Door.

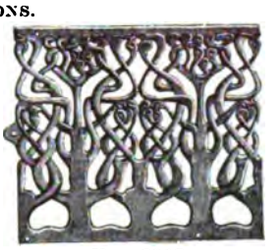


Fig. 2913.
To Cover Heater Pipes.

Fig. 2914.
For Vestibule and King Pin Plate.

Fig. 2915.
For Door.

Ornamental Cast Work. Grilles, Etc. D. M. Co.

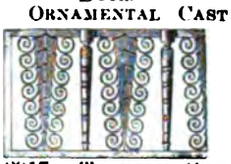


Fig. 2917. Transom Grille.

Fig. 2920. Transom Grille.
One-Half.

Fig. 2921. Berth Front Border.

Fig. 2916.
Mirror Frame.

Fig. 2918. Mirror Frame.

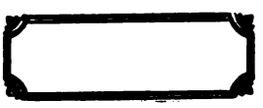


Fig. 2919. Mirror Frame.
Ornamental Cast Work. D. M. Co.

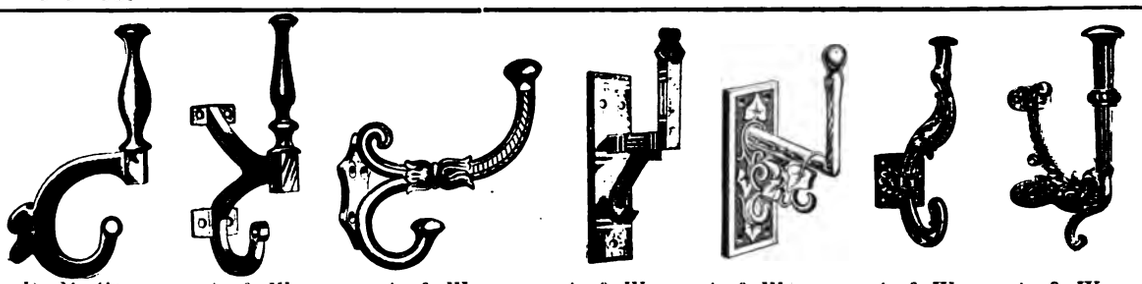
Fig. 2922.
Berth Corner.

Figs. 2923-2924. Partition or Window Panels.
Panel Decorations in Relief. They Are Veneered with Natural Wood.

Fig. 2925.
Deck Window Panel.

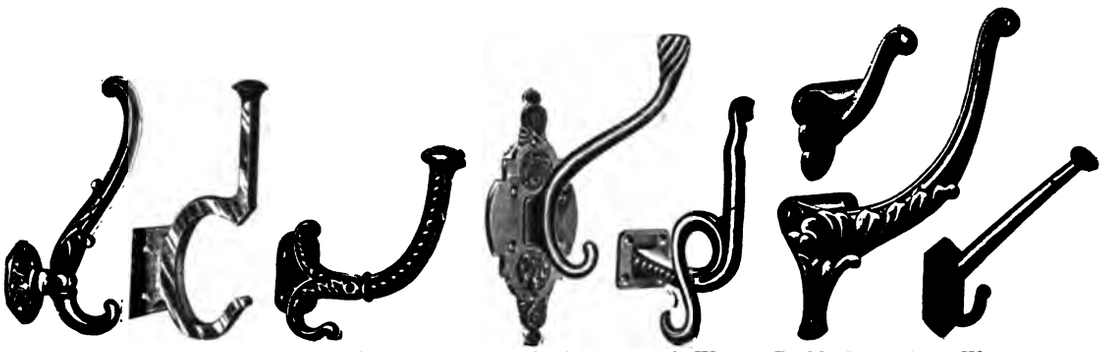
Fig. 2926. For Bulkheads.

Figs. 2927-2928. Cast Grilles. A. & W.



D. M. Co. A. & W. A. & W. A. & W. A. & W. A. & W. A. & W.

FIGS. 2929-2935. COAT AND HAT HOOKS.

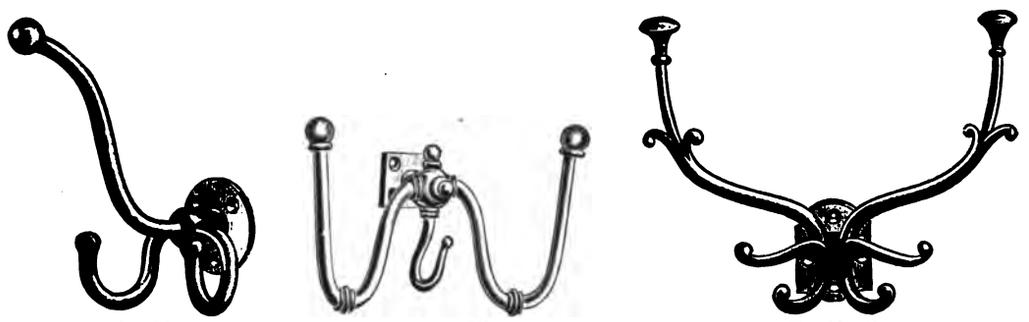


A. & W. D. M. Co. A. & W. D. M. Co. A. & W. D. M. Co. A. & W.

FIGS. 2936-2943. COAT AND HAT HOOKS.

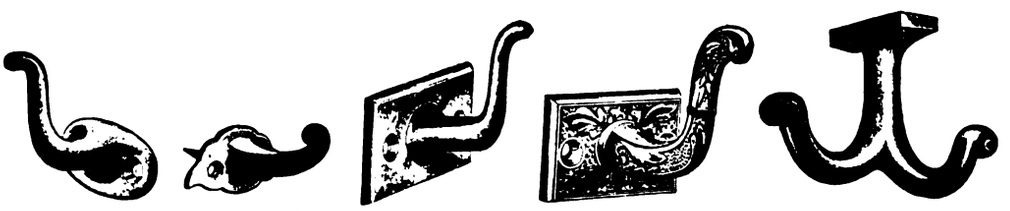
A. & W. D. M. Co. A. & W. A. & W.

FIGS. 2944-2947. COAT AND HAT HOOK CLUSTERS.



D. M. Co. A. & W. D. M. Co.

FIGS. 2948-2950. COAT AND HAT HOOK CLUSTERS.



FIGS. 2951-2955. COAT HOOKS. D. M. Co.

FIG. 2956. UMBRELLA HOLDER. A. & W.

FIG. 2957. UMBRELLA HOLDER POCKET. A. & W.

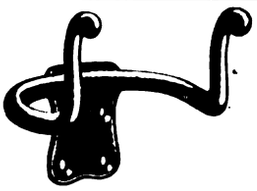


FIG. 2958.
BROOM HOLDER OR HOOK.
D. M. CO.

FIG. 2959.
WHISK BROOM HOLDER.
D. M. CO.

FIG. 2960.
BROOM HOLDER.
D. M. CO.

FIG. 2961.
CAR WASHER.

FIG. 2962.
BROOM IN HOLDER.
D. M. CO.

FIG. 2963.
WHISK BROOM AND HOLDER.
D. M. CO.

FIG. 2964.
CAR WASHER.

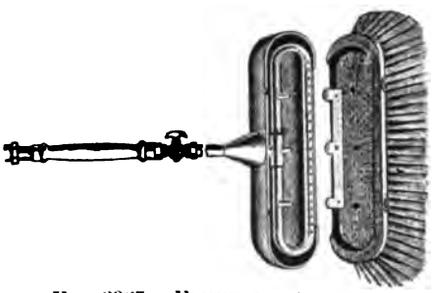


FIG. 2965. FOUNTAIN CAR WASHER.

FIG. 2966. WINDOW CLEANER.
D. M. BOSELEY CO.

FIG. 2966a. AX, POCKET AND HOLDER.

FIG. 2969.
BABCOCK FIRE EXTINGUISHER.
A. ACID BOTTLE.
B. ACID BOTTLE CARRIER.

FIGS. 2970-2971. CHAPMAN JACK.
CHAPMAN JACK CO.

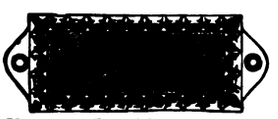


FIG. 2967. MATCH STRIKER.

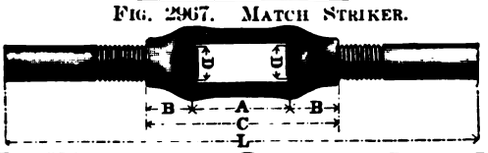


FIG. 2968. CLEVELAND TURNBUCKLE, R. AND L.
CLEVELAND CITY FORGE AND IRON CO.

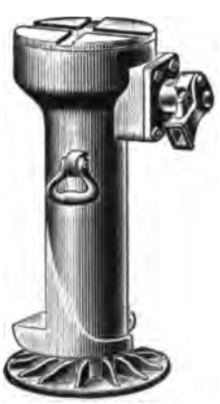


FIG. 2972.
50-TON
WRECKING JACK.

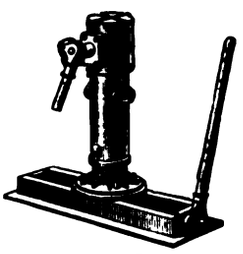


FIG. 2973.
TRAVERSING JACK.

FIG. 2974.
25-TON
WRECKING JACK.

FIG. 2975.
15-TON
GROUND JACK.

FIG. 2976.
SECTIONAL VIEW.

FIG. 2977.
25-TON CAR JACK.

FIG. 2978.
BROAD BASE JACK.

FIG. 2979.
CLAW TYPE OF JACK.

FIG. 2980.
JOURNAL BOX JACK.

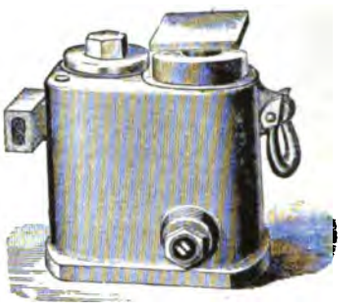


FIG. 2981.
JOURNAL BOX JACK.

WATSON AND STILLMAN HYDRAULIC JACKS.

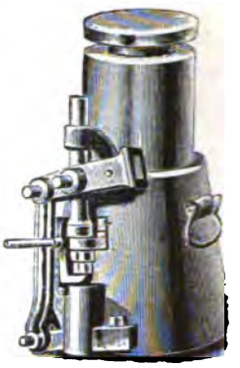
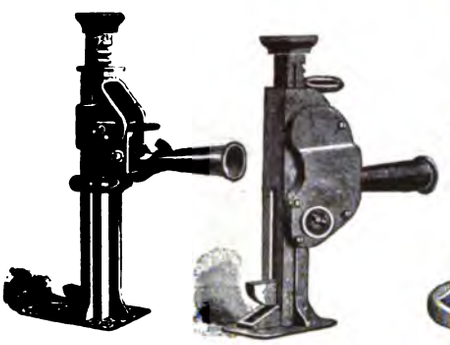


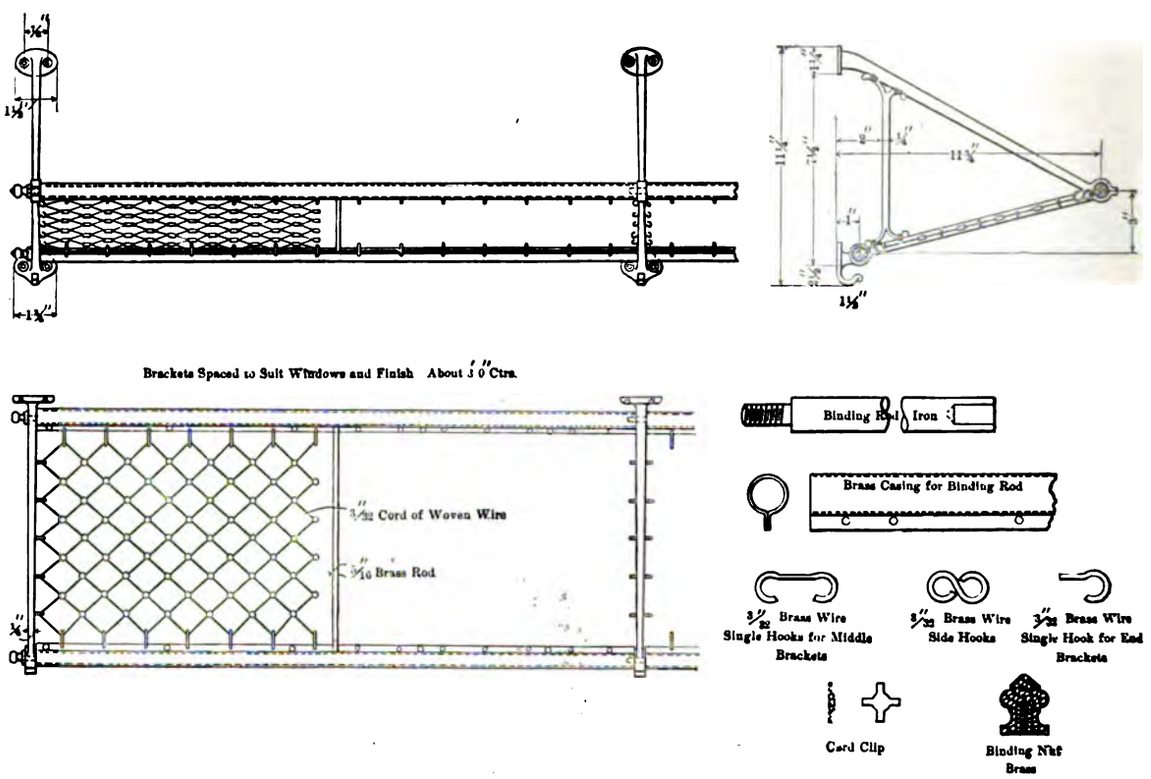
FIG. 2982.
DOUBLE PISTON OUTSIDE PUMP JACK.



FIGS. 2983-2984. BARRETT'S DOUBLE ACTING LEVER AND RACK JACKS.
DUFF MFG. CO.

FIG. 2985. BROAD BASE JACK.

FIG. 2986. JOURNAL BOX JACK
DUDGEON'S HYDRAULIC JACKS.


Brackets Spaced to Suit Windows and Finish About 3' 0" Ctrs.
3/32" Cord of Woven Wire
9/16" Brass Rod
Binding Rod
Iron
Brass Casing for Binding Rod
3/32" Brass Wire Single Hooks for Middle Brackets
3/32" Brass Wire Side Hooks
3/32" Brass Wire Single Hook for End Brackets
Cord Clip
Binding Nut Brass

FIGS. 2987-2998. CONTINUOUS BASKET RACK AND DETAILS. FIRST-CLASS COACH. N. Y., N. H. & H.

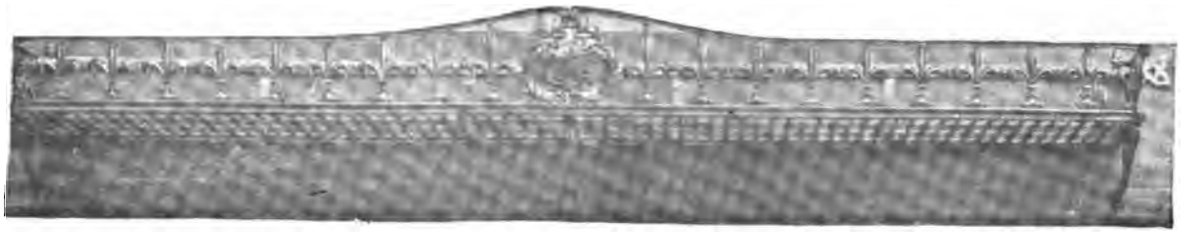


Fig. 2999. Long Cast Basket Rack.

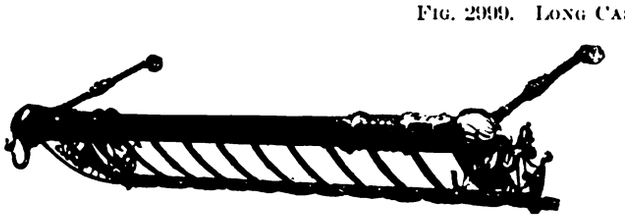


Fig. 3000.

Cast Basket Racks.

Fig. 3001.

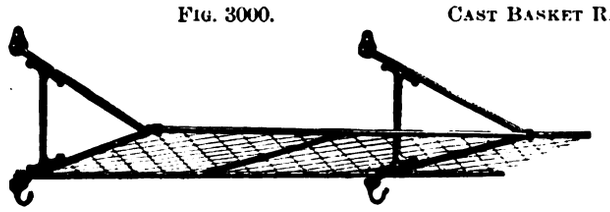


Fig. 3002.
Continuous Basket Rack.
D. M. Co.

Fig. 3004.
Wire Basket Rack, with Cast Ends. A. & W.

Fig. 3003.
Continuous Basket Rack.
D. M. Co.

Fig. 3005.
Cast Basket Rack.
A. & W.

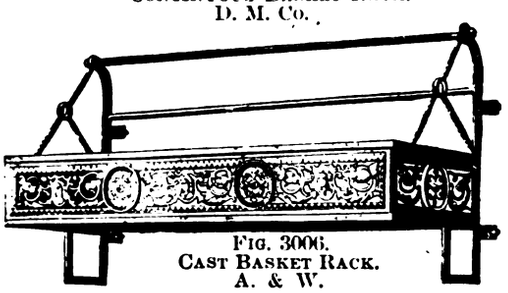


Fig. 3006.
Cast Basket Rack.
A. & W.

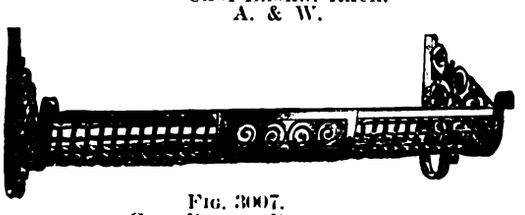


Fig. 3007.
Cast Basket Rack.
A. & W.

Fig. 3008.
Cast Basket Rack.
D. M. Co.

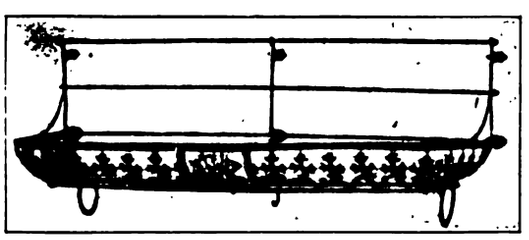


Fig. 3009.
Cast Basket Rack.
Page Bros. & Co.

Fig. 3010.
Wire Basket Rack with Cast Brackets.
D. M. Co.

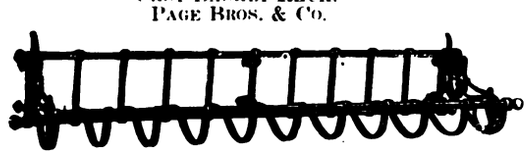


Fig. 3011. Cast Basket Rack.
A. & W.

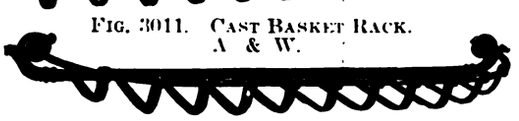


Fig. 3012.
Cast Basket Rack.
A. & W.

Figs. 3013-3016.
Cast Bracket Ends for Basket Racks.
A. & W.

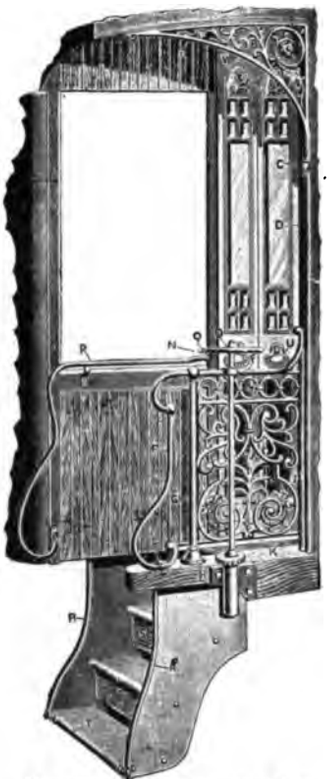


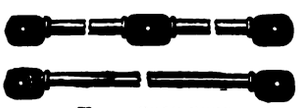
Fig. 3017. Perspective View. Vestibuled Platform and Trimmings.

Names of Parts. Fig. 3018.

A. *Ornamental Casting*
B. *Ornamental Casting*
C. *Hand Rail Nut*
D. *Flush Handle*
E. *Brake Staff Holder*
F. *Step Fender*
G. *Platform End Rail*
H. *Body Grab Rail*
I. *Brake Wheel*
J. *Connecting Strip*
K. *Door Frame*
L. *Ornamental Casting*
M. *Door Frame*

Names of Parts. Fig. 3017.

A. *Connecting Strip End*
B. *Ornamental Casting*
C. *Post Rail Ornament*
D. *Connecting Strip*
E. *Connecting Strip*
F. *Grab Rail*
G. *Post*
H. *Rail Base*
I. *Rail Panel*
J. *Rail Post Strip*
K. *Bottom Rail*
L. *Rail Bolt*
M. *Brake Staff Holder*
N. *Brake Wheel*
O. *Hand Rail Nut*
P. *Body Grab Rail*
Q. *Grab Rail Bushing*
R. *Step Fender*
S. *Step Molding*
T. *Step Molding*
U. *Door Drop Handle*
V. *Ornamental Casting*



Figs. 3019-3020. Window Guard Rods.

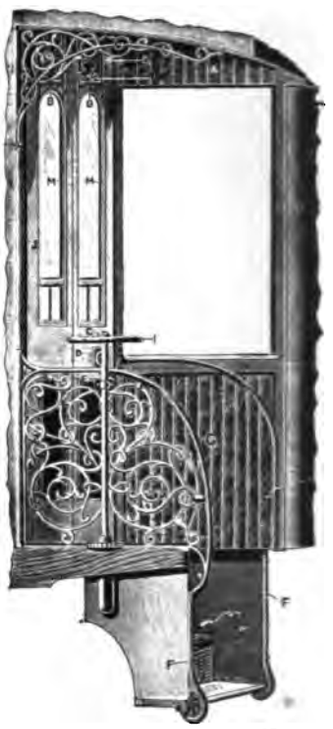
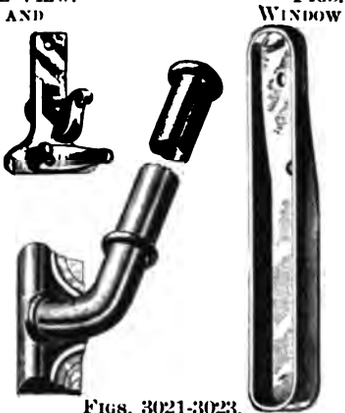


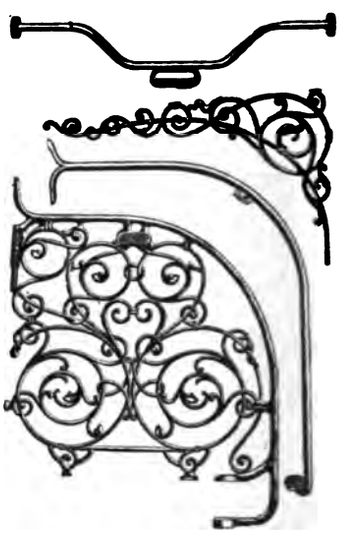
Fig. 3018. Perspective View. Vestibuled Platform and Trimmings. D. M. Co.



Figs. 3021-3023. Door Guard Drop Rod Catch and Pocket. D. M. Co.

Fig. 3024. Platform Gate Panel. A. & W.

Fig. 3025. Platform Brace. A. & W.



Figs. 3033-3035. Platform End Hand Rails, Panel and Bracket. A. & W.

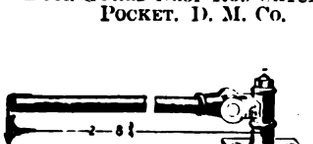
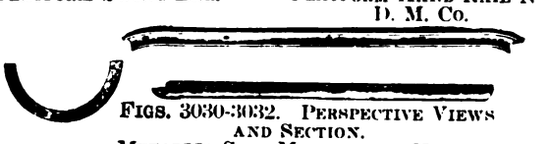


Fig. 3026. Platform Swing Bar.

Figs. 3027-3029. Platform Hand Rail Nuts. D. M. Co.



Figs. 3030-3032. Perspective Views and Section. Metallic Step Moldings or Nosings. D. M. Co.

Figs. 3036-3037. Step Facings. Right and Left. A. & W.

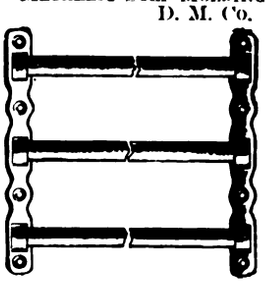


Fig. 3038. Window Guard Brackets and Rods. D. M. Co.

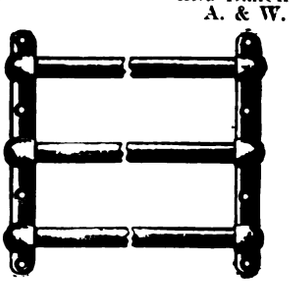


Fig. 3039.

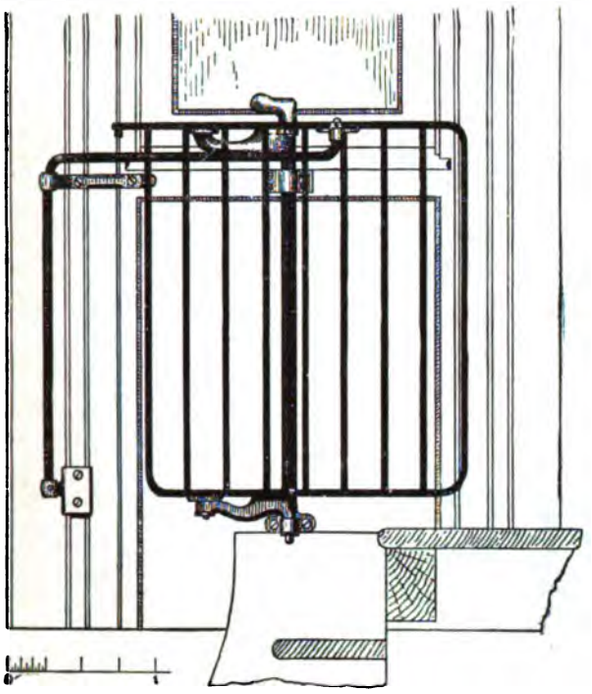
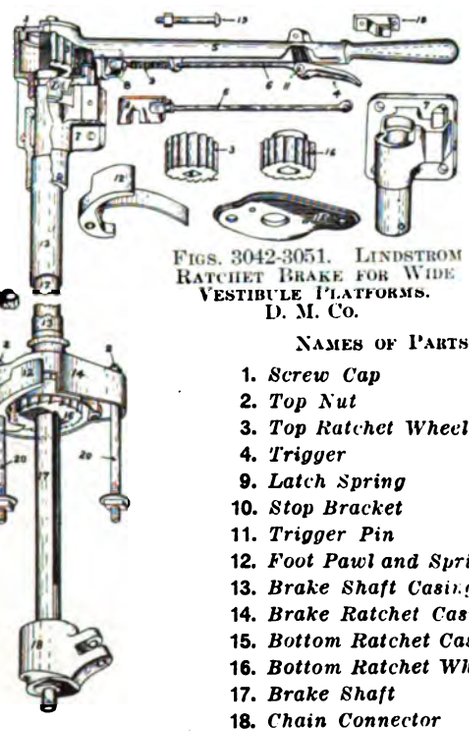


Fig. 3040. Elevation of Open Gate.
Wood's Platform Gate.

Fig. 3041. Perspective View.
Wood's Platform Gate, Decorated.



Figs. 3042-3051. Lindstrom Ratchet Brake for Wide Vestibule Platforms.
D. M. Co.

Names of Parts. Figs. 3042-3051.

1. *Screw Cap*
2. *Top Nut*
3. *Top Ratchet Wheel*
4. *Trigger*
5. *Brake Handle*
6. *Trigger Rod*
7. *Shaft Bracket*
8. *Latch*
9. *Latch Spring*
10. *Stop Bracket*
11. *Trigger Pin*
12. *Foot Pawl and Spring*
13. *Brake Shaft Casing*
14. *Brake Ratchet Casing*
15. *Bottom Ratchet Casing Plate*
16. *Bottom Ratchet Wheel*
17. *Brake Shaft*
18. *Chain Connector*
19. *Shaft Bracket Bolts and Nuts*
20. *Bottom Ratchet Casing Bolts and Bottom Nuts*

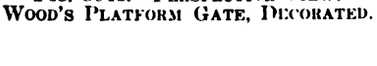
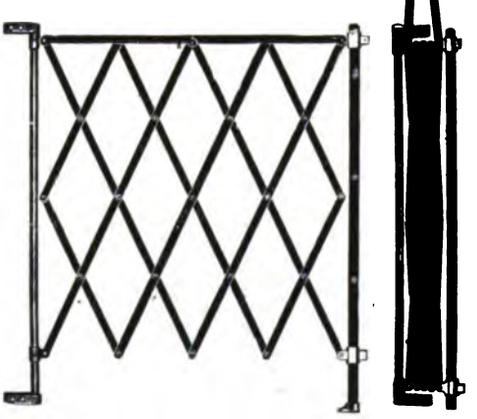
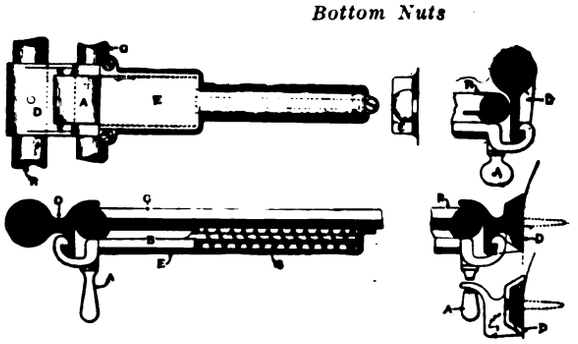


Fig. 3052. Platform Chain.



Figs. 3053-3054. Open Closed.
Folding Platform Tail Gate.



Figs. 3055-3060. Latch for Platform Gates of Pullman Observation Cars.

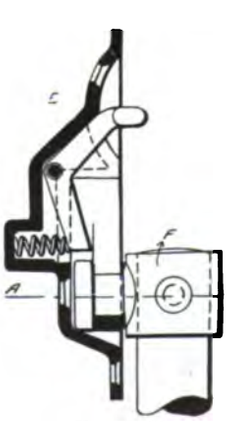


Fig. 3061.
Section at Center.

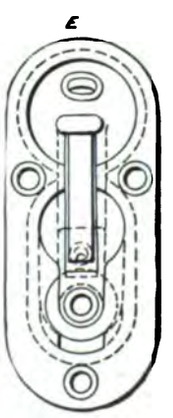
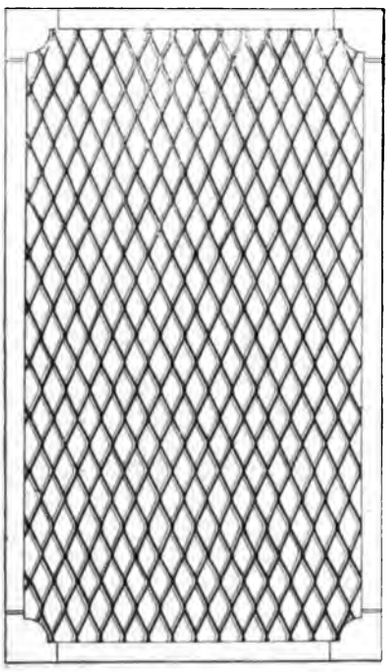


Fig. 3062.
Back View.
Catch for Pullman Vestibule Gate.



FIGS. 3063-3064.
EXPANDED METAL WINDOW GUARD,
POSTAL CARS. MERRITT & CO.

FIG. 3065. LETTER BOX LID.
D. M. Co.

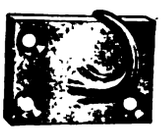


FIG. 3067.
MAIL BAG HOOK.
A. & W.

FIG. 3068
LETTER CASE
LABEL HOLDER
D. M. Co.

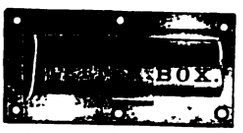


FIG. 3066. LETTER BOX LID.
A. & W.

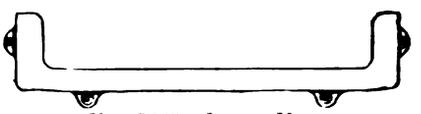


FIG. 3069. LABEL HOLDER.

FIG. 3070.

FIG. 3071.

FIG. 3072.
SAFETY ROD BRACKET, BUSHING AND "T JOINT.
D. M. Co.

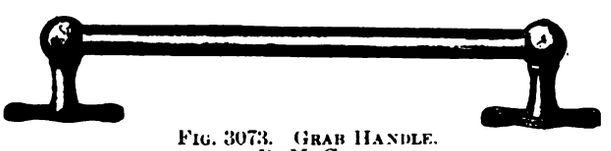
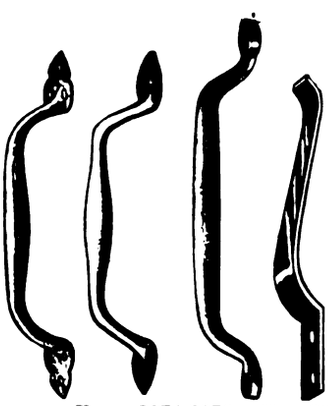


FIG. 3073. GRAB HANDLE.
D. M. Co.



FIGS. 3074-3076.
DOOR HANDLES.
D. M. Co.

FIG. 3077.
LETTER CASE
LABEL HOLDER.
D. M. Co.

FIG. 3078.
DOOR WEDGE
AND CLASP.
D. M. Co.

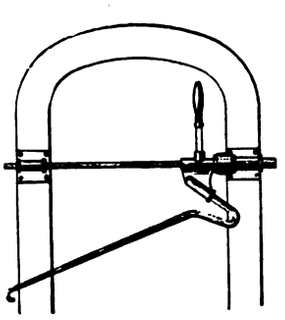


FIG. 3079.
MAIL BAG CATCHER.

FIG. 3080.

FIG. 3081.
POUCH HOOKS.
D. M. Co.

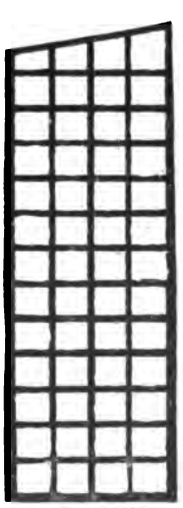


FIG. 3082.
PAPER CASE CASTING.
D. M. Co.

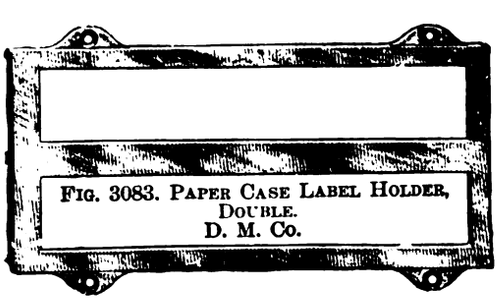


FIG. 3083. PAPER CASE LABEL HOLDER,
DOUBLE.
D. M. Co.

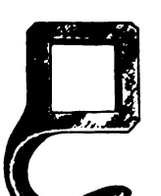
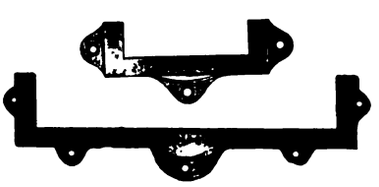


FIG. 3084.

FIG. 3085.
POUCH HOOKS.
A. & W.



FIGS. 3086-3087.
PAPER CASE LABEL HOLDERS.
A. & W.

FIG. 3088.
PAPER CASE LABEL HOLDER.
A. & W.

FIG. 3089.

FIG. 3090.

HOWARD'S PATENT RAILWAY WATER CLOSETS. JAS. L. HOWARD & CO.

FIG. 3091. SLOPING CONE SHAPED CLOSET HOPPER. D. M. CO.

FIG. 3092. STRAIGHT EARTHEN CLOSET HOPPER. A. & W.

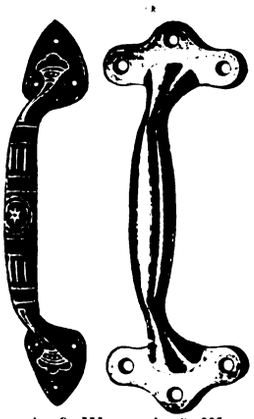
FIG. 3093. STRAIGHT CONE SHAPED EARTHEN HOPPER. A. & W.

FIG. 3094. OBLIQUE CONE SHAPED IRON HOPPER. D. M. CO.

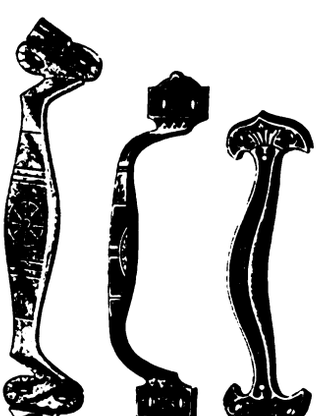
FIG. 3095. EARTHEN HOPPER WITH SQUARE VENT. A. & W.

FIG. 3096. PORCELAIN WASH BOWL. D. M. CO.

A. & W.



A. & W. A. & W.



D. M. CO. D. M. CO. A. & W.

FIGS. 3097-3102. SALOON HANDLES.

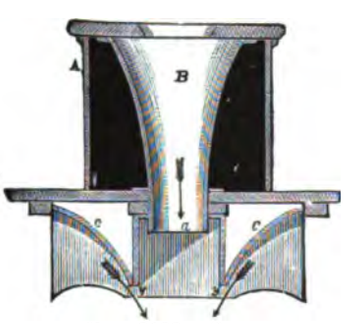
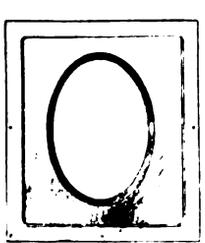
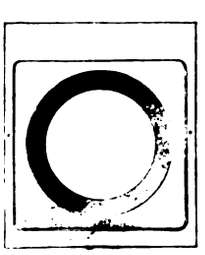


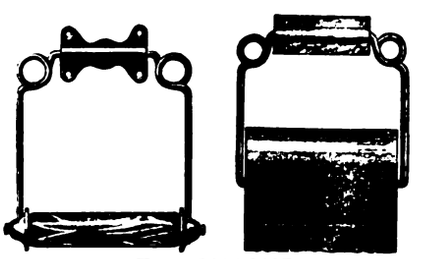
FIG. 3103. SECTION. BELL'S EXHAUST HOPPER VENTILATOR.

A. CLOSET HOPPER CASING.
B. CLOSET HOPPER.
C. CONE.
Y. THROAT OF VENTILATOR.





FIGS. 3104-3105.
ENAMELED DRIP TRAY FOR OVAL SEAT. D. M. CO.
ENAMELED DRIP TRAY FOR ROUND SEAT. D. M. CO.



FIGS. 3106-3107. PAPER HOLDERS AND ROLL. D. M. CO.

FIGS. 3108-3109. PAPER HOOKS. D. M. CO.

FIG. 3110. WITH HOOD, TABS AND LIP.

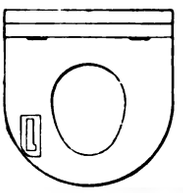
FIG. 3111. WITH HOOD, TABS, LIP AND VENTILATOR

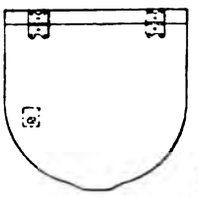
FIG. 3112. PLAIN ENAMELED IRON URINAL.

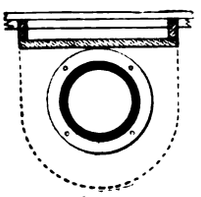
CORNER URINALS. D. M. Co.

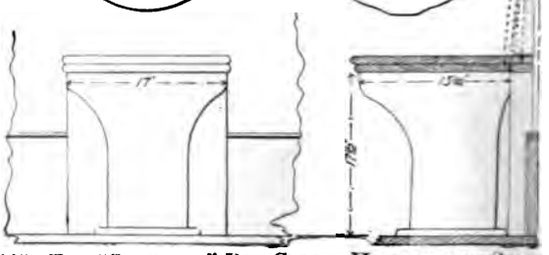
FIG. 3113. PLAIN SIDE URINAL.

FIG. 3114. PLAIN CORNER URINAL.

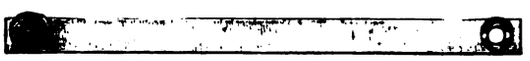




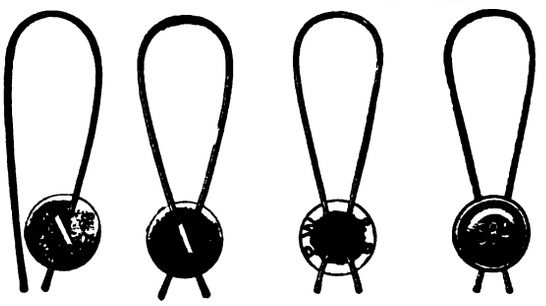




FIGS. 3115-3119. THE "STANDARD" DRY CLOSET HOPPER AND SEAT. D. M. Co.



FIGS. 3120-3121. TIN CUP SHACKLE CAR SEAL. E. J. BROOKS & CO.



FIGS. 3122-3125. SAFETY CROSS WIRE TIN AND LEAD SEALS. E. J. BROOKS & CO.

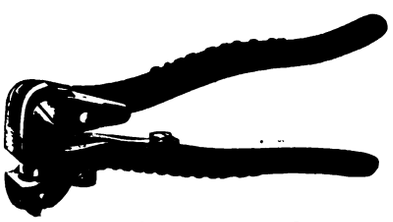
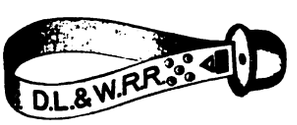
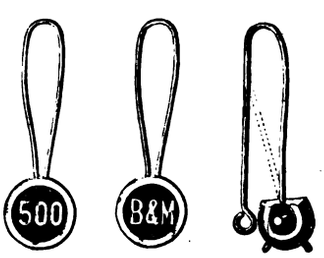


FIG. 3126. RATCHET SEAL PRESS.

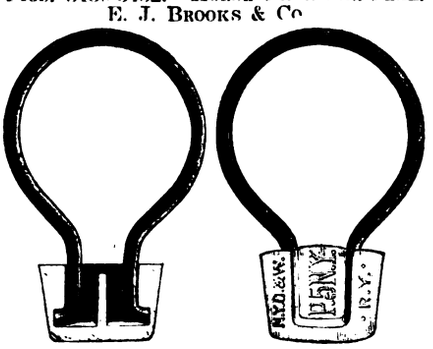
FIG. 3127. RATCHET SEAL PRESS. E. J. BROOKS & CO.



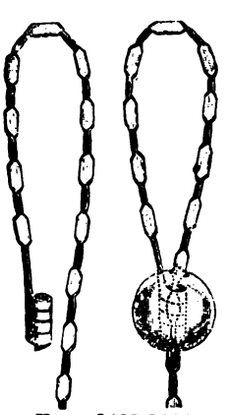
FIGS. 3128-3129. SELF LOCKING SEAL. E. J. BROOKS & CO.



FIGS. 3130-3132. HORSE SHOE CAR SEAL. E. J. BROOKS & CO.



FIGS. 3138-3139. KEYSTONE CAR SEAL.



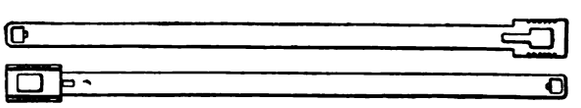
FIGS. 3133-3134. SAFETY CAST IN COIL WIRE PEBBLED LEAD SEAL WITH INDENTED B WIRE.

FIG. 3135. SIX-PLY WIRE SHACKLE AND LEAD CAR SEAL.

FIG. 3136. THE PERFECTION STAMPED ENCASED EYELET RIVET SHACKLE.

FIG. 3137. CENTRAL CAST IN CROSSWISE LEAD SEAL WITH DETECTIVE WIRE

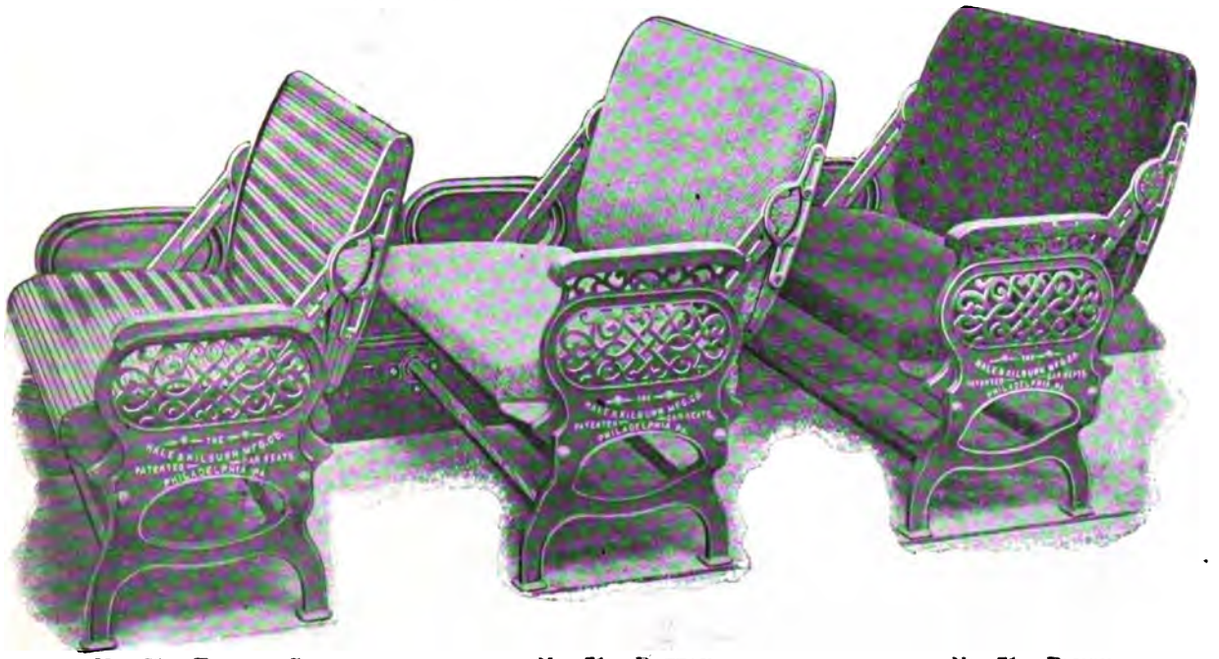
CAR SEALS. E. J. BROOKS & CO.



FIGS. 3140-3141. HOLLAND CAR SEAL. THE HOLLAND CO.

No. 72. No. 73. No. 75.

FIGS. 3142-3144. STANDARD SEATS FOR COACHES.



No. 71. ELASTIC SLAT. No. 71. RATTAN. No. 71. PLUSH.

FIGS. 3145-3147. SEATS FOR SUBURBAN AND NARROW GAGE CARS.

No. 73½. No. 99A. No. 80¾.

FIGS. 3148-3150. SEATS FOR ELECTRIC AND CABLE CARS. REVERSIBLE BACK AND TILTING SEAT.

FIG. 3151. PERSPECTIVE VIEW.
No. 73. HIGH BACK TILTING CAR SEAT.

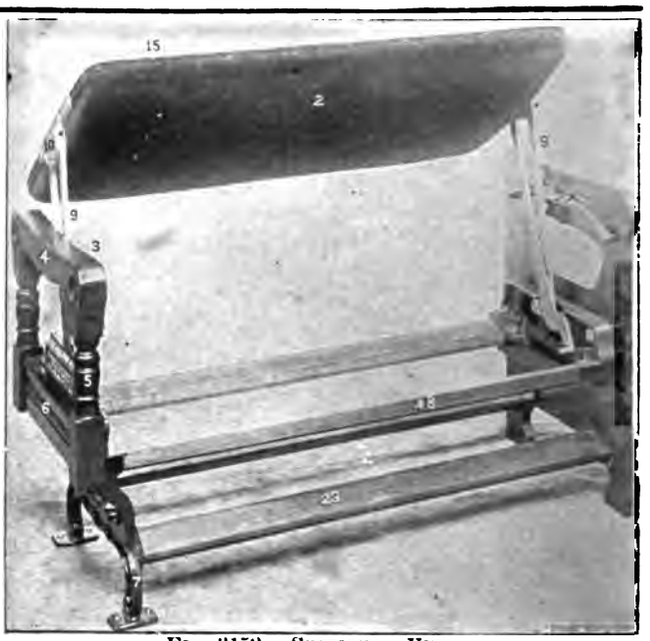


FIG. 3152. SECTIONAL VIEW.
No. 73. HIGH BACK TILTING CAR SEAT.

NAMES OF PARTS OF SEATS.
FIGS. 3151-3152, ETC.

1. *Cushion*
2. *Back*
3. *Seat End*
4. *Arm Rest*
5. *Seat End Rest*
6. *Seat End Rail*
7. *Cricket or Base Casting*
8. *Wall Socket Casting*
9. *Striker Arms*
10. *Seat Back Pivot Plate*
12. *Cushion Frame*
13. *Spring Seat Slats*
14. *Spiral Springs*
15. *Back Band*
23. *Foot Rail*
25. *Connecting Rod*
27. *Guide Casting*

No. 90. WALKOVER CAR SEAT, PLAIN HIGH BACK.
FIG. 3153.

29. *Leg Rest*
30. *Leg Rest Ratchet Casting*
31. *Leg Rest Pivot Casting*
33. *Leg Rest Ratchet Case*
35. *Seat Tilting Lever*
37. *Rocker or Tilting Casting*
38. *Seat End Casting*
47. *Back Frame*
48. *Connecting Rail*
49. *Foot Rest Casting*
50. *Spring Back Section*
51. *Flexible Spring Edge*
52. *Head Roll*
53. *Rocker Casting*
54. *Flexible Steel Band*
55. *Cap Casting*
56. *Division Arm*
57. *Push Down*
58. *Seat Lock*

No. 197. WALKOVER SEAT WITH PRESSED STEEL FIXTURES.
FIG. 3154.

No. 96. WALKOVER SEAT.
FIG. 3155.

No. 97. WALKOVER SEAT, CAST PEDESTAL END.
FIG. 3156.

FIG. 3157. No. 32. PERSPECTIVE

FIGS. 3158-3160. DETACHABLE CUSHION AND BACK.

No. 34. PARLOR CAR CHAIR.
FIG. 3161.

FIG. 3162. REVOLVING PARLOR CAR CHAIR. WITH DETACHABLE CUSHION.

No. 38. PARLOR CAR CHAIR.
FIG. 3163.

No. 30. PARLOR CAR CHAIR.
FIG. 3164.

No. 35. PARLOR CAR CHAIR.
FIG. 3165.

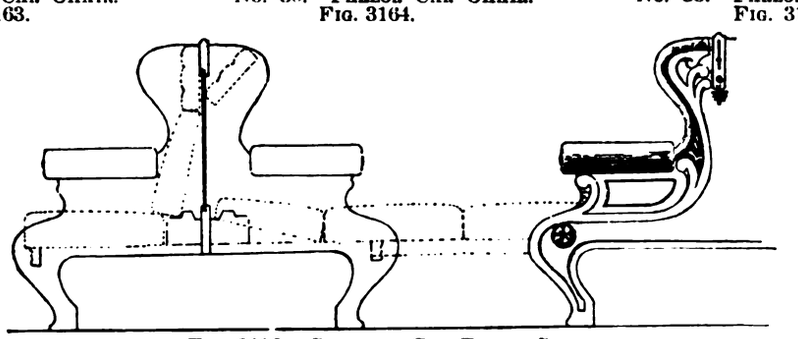


FIG. 3166. SLEEPING CAR BERTH SEATS.
DOTTED LINES SHOW POSITION OF CUSHIONS WHEN DRAWN OUT TO MAKE THE BED.

FIG. 3167. NO. 90. WALKOVER SEAT WITH EXTRA HIGH HEAD ROLL BACK.

FIG. 3168. NO. 175. REVERSIBLE SEAT, PRESSED STEEL OVAL BASE.

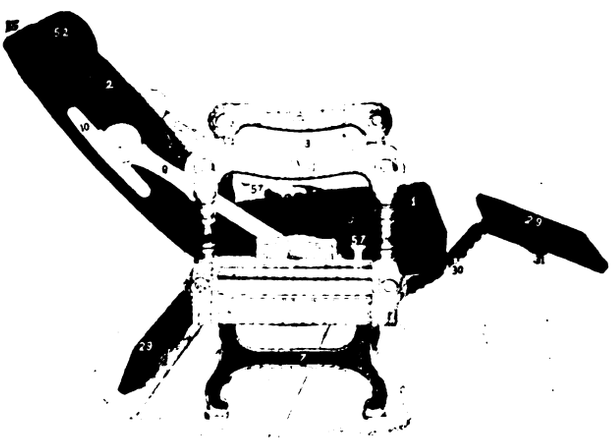


FIG. 3169. NO. 64. RECLINING AND TILTING TWIN CAR SEAT. WITH LEG AND FOOT RESTS.

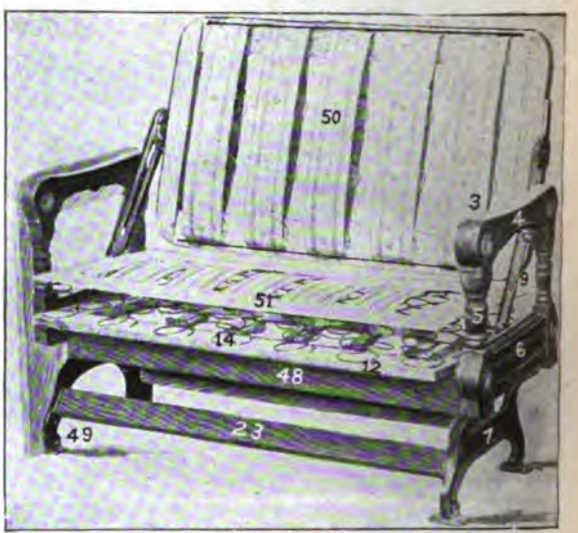


FIG. 3170. NO. 73. CAR SEAT IN PROCESS OF CONSTRUCTION. WITH STEEL TOP SPRING EDGE CUSHION AND BACK.

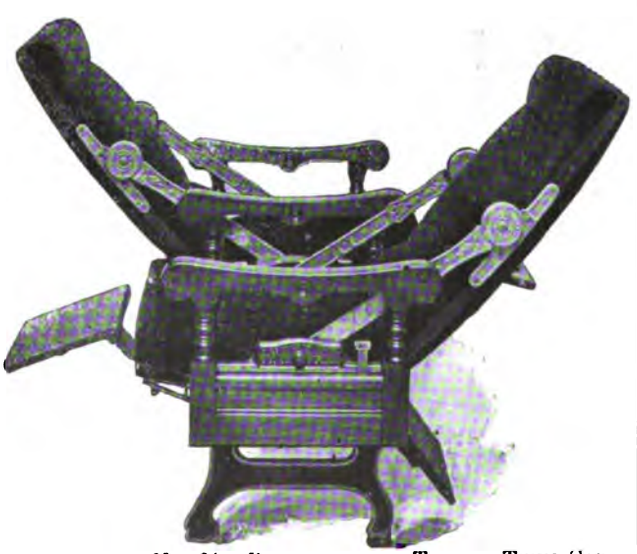


FIG. 3171. NO. 64. RECLINING AND TILTING TWIN CAR SEAT. WITH DIVISION ARM.

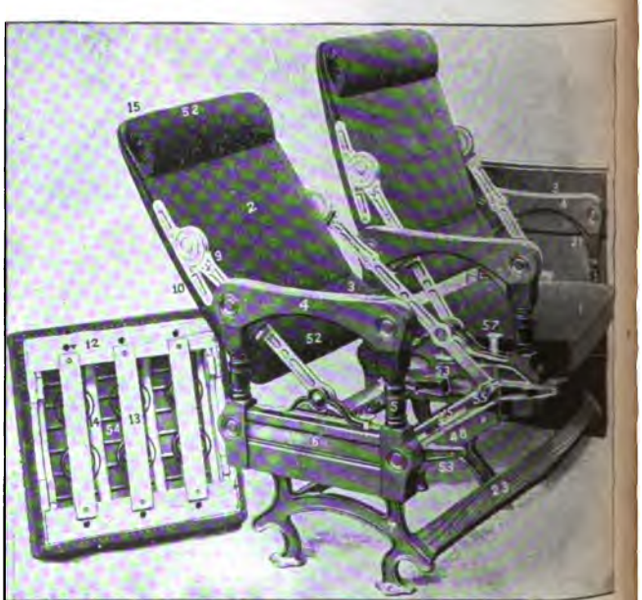


FIG. 3172. NO. 64. RECLINING CAR SEAT. HIGH BACK. TWIN TILTING SEAT, WITHOUT LEG REST.

Fig. 3173. Wheeler Slideover Seat without Ends for Electric Service.

Fig. 3174. No. 38W. Wheeler Slideover Seat with High Back and Pedestal Base.

Fig. 3175. No. 36S. Wheeler Slideover Seat, High Back, Head Roll, Adjustable Foot Rest.

Fig. 3176. No. 104 P. & S. High Turnover Back with Adjustable Foot Rest.

Fig. 3177. No. 102. P. & S. Seat in Plush for Steam Road Service.

Fig. 3178. No. 97B. Wakefield Double Revolving Individual Car Seats.

Fig. 3179. No. 99. P. & S. Seat for Electric Service.

Fig. 3180. No. 42C. Wheeler Slideover Seat, Rattan, for Electric Cars.

Fig. 3181. Upholstered Rattan Chair for Parlor Cars.

FIG. 3182. NO. 70. SWING BACK SEAT FOR ELECTRIC AND SUBURBAN SERVICE.

FIG. 3183. NO. 52. EXTRA HIGH BACK COACH SEAT, PEDESTAL END. PLUSH.

FIG. 3184. NO. 17. REVERSIBLE SEAT FOR SECOND CLASS OR SMOKING CARS.

FIG. 3185. EXTRA HIGH BACK SEAT. CUSHION REMOVED AND SEAT TILTED TO SHOW MECHANICAL CONSTRUCTION.

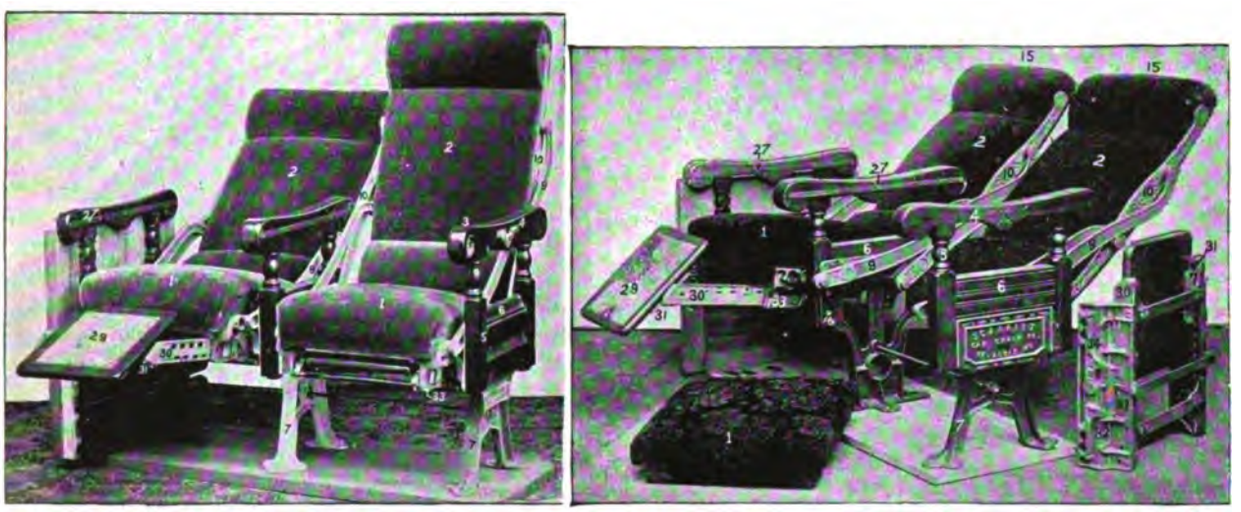
FIG. 3186. EXTRA HIGH BACK SEAT. WITH HEAD ROLL AND ADJUSTABLE FOOT REST.

FIG. 3187. EXTRA HIGH BACK SEAT. TILTED TO SHOW MECHANICAL PARTS.

NUMBERS REFER TO LIST OF NAMES WITH FIGS. 3224-3225.

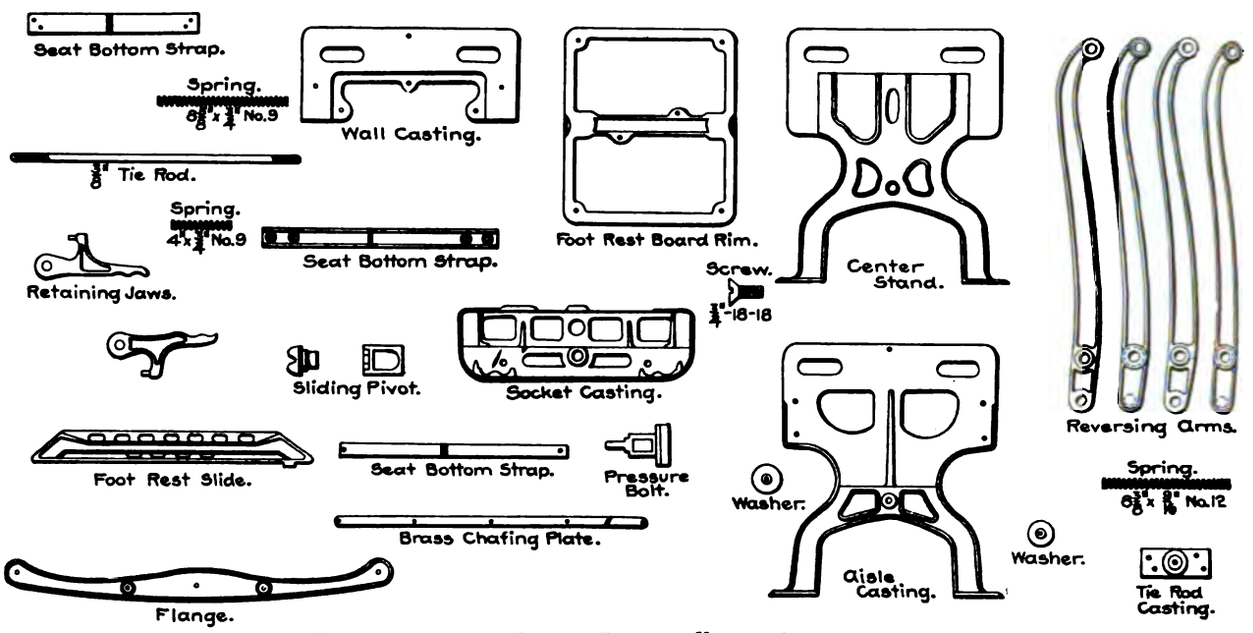
FIG. 3188. NO. 64. EXTRA HIGH BACK COACH SEAT, PEDESTAL END, IN PLUSH.

FIG. 3189. NO. 59. TWIN REVERSIBLE RECLINING CHAIR, ONE BACK INCLINED, FOOT REST EXTENDED.



FIGS. 3190-3191. NO. 59. SCARRITT-FORNEY RECLINING TWIN SEATS.

FIGS. 3192-3194. SCARRITT'S DRAWING ROOM CAR CHAIRS.



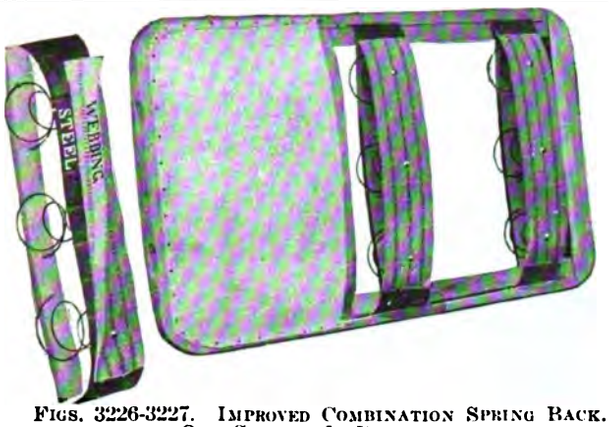
Figs. 3195-3223. Names of Parts. Scarritt-Forney Reclining Chair Seat.

Fig. 3224. Richards' Panel Back Reclining Chair Seat.

Fig. 3225. Richards' Panel Back Parlor Car Chair. Pullman Pattern.

Names of Parts. Figs. 3169-3191.

1. *Seat Cushion*
2. *Seat Back Cushion*
3. *Seat End*
4. *Arm Rest*
5. *Seat End Rest*
6. *Seat End Rail*
7. *Seat Stand*
8. *Wall Pivot Plate*
9. *Seat Back Reversing Arms*
10. *Seat Back Pivot Plate*
11. *Seat Socket Castings*
12. *Seat Frame*
13. *Seat Slats*
14. *Seat Springs*
15. *Seat Back*
16. *Seat Back Frame*
17. *Seat Back Springs*
18. *Foot Rest Stand*
19. *Foot Rest Arm*
20. *Foot Rest Pawl*
21. *Foot Rest Ratchet*
22. *Foot Rest Pawl Stop*
23. *Foot Rest Stop*
25. *Seat Stand Tie Rod or Strut*
26. *Seat Stand Tie Rod Casting*
27. *Friction Plate*
28. *Friction Plate Strip*
29. *Leg Rest*
30. *Leg Rest Slide*
31. *Leg Rest Casting*
32. *Socket Casting and Guide for Leg Rest*
33. *Spring for Retaining Jaw*
34. *Retaining Jaw*



FIGS. 3226-3227. IMPROVED COMBINATION SPRING BACK. ONE SECTION IS DETACHED.

FIGS. 3228-3229. IMPROVED COMBINATION SPRING CUSHION. WITH ONE SECTION DETACHED.

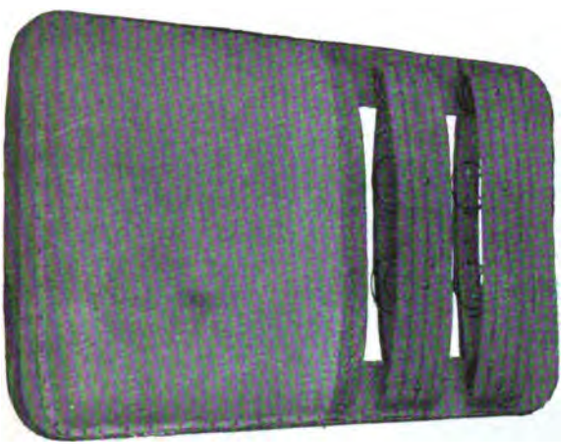
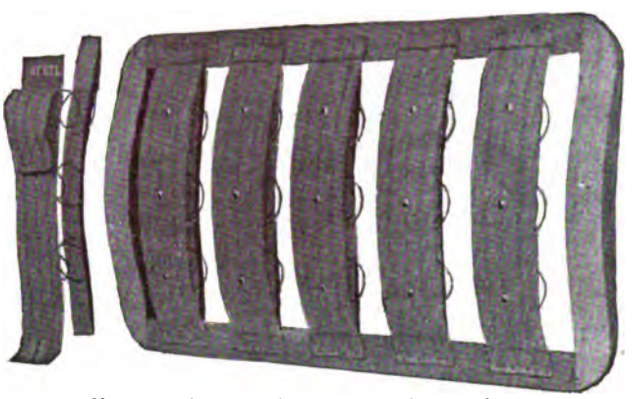


FIG. 3230. SPRING EDGE BACK.



FIGS. 3231-3232. REVERSIBLE SPRING BACK READY FOR UPHOLSTERING.

SECTIONAL VIEWS SHOWING CONSTRUCTION OF SPRING EDGE BACK.

FIG. 3233. SECTIONAL VIEWS, SHOWING THE USE OF SLAT AND WEBBING AND THE ELASTIC SLAT EDGE.

FIGS. 3234-3235. REVERSE SIDE OF SINGLE AND DOUBLE RATTAN SPRING SEATS. SHOWING CONSTRUCTION.

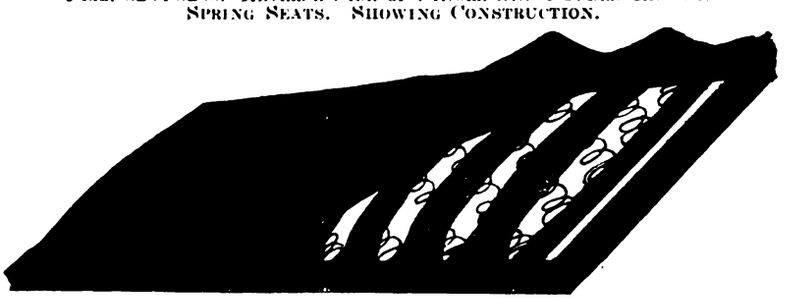
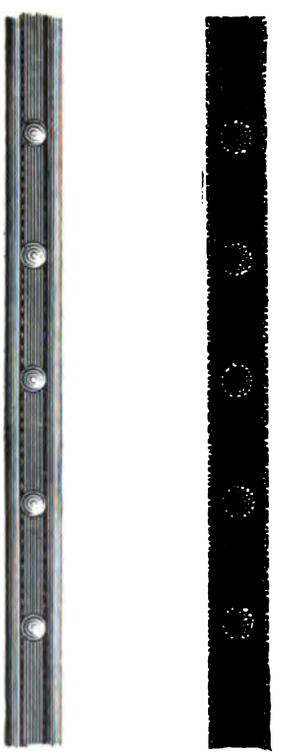


FIG. 3236. SLEEPING CAR BERTH SPRING FOR UPPER BERTH.



FIGS. 3237-3238.
LEATHER BAND AND NAILS. PLUSH BANDS. AND NAILS.

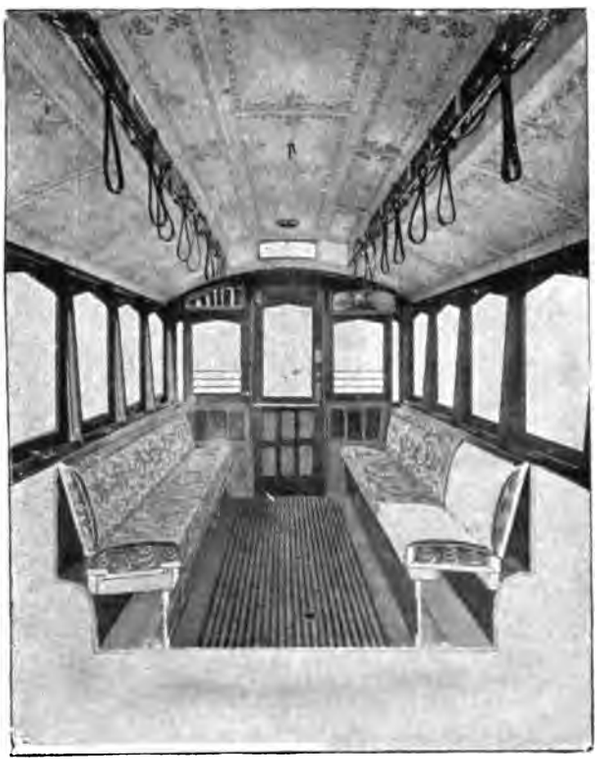


FIG. 3239. INTERIOR VIEW OF STREET CAR. METHOD OF UPHOLSTERING SIDE SEATS OF SUBURBAN AND STREET CARS.

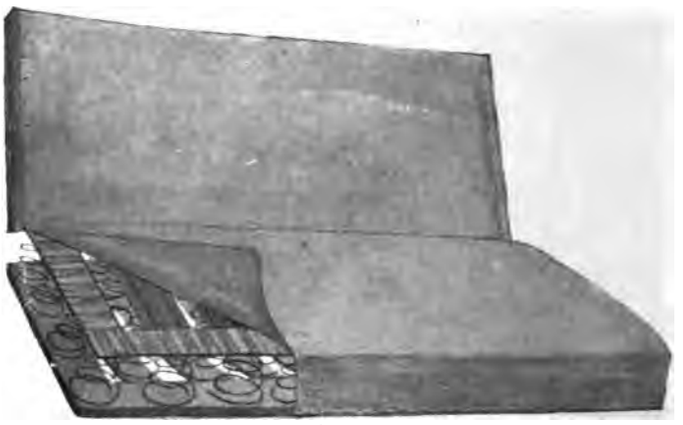


FIG. 3240.
PATENT SPRING EDGE SLEEPING CAR CUSHION AND BACK.

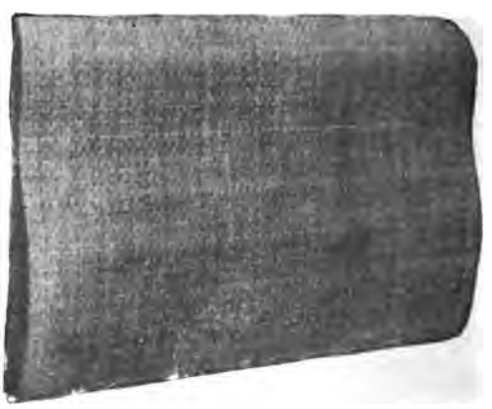


FIG. 3241. RATTAN CROSS SEAT SPRING BACK WITH HEAD REST.

FIG. 3242. SPRING BED SECTIONS FOR PRIVATE AND SLEEPING CARS.

FIG. 3243. DOUBLE RATTAN SPRING CROSS SEAT.

FIG. 3245.
DETACHED SECTION OF THE COBB PATENT ELLIPTIC SPRING.

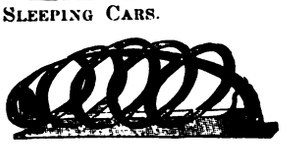


FIG. 3246.
BROAD BAND ELLIPTIC SEAT SPRING.
HALE & KILBURN MANUFACTURING COMPANY.

FIG. 3244.
SINGLE SIDE SEAT.

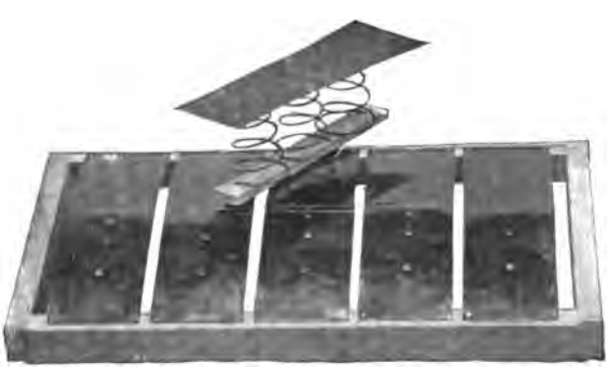


FIG. 3247. SPRING PLATE AND SPRING CONSTRUCTION.
AMERICAN CAR SEAT COMPANY.

FIG. 3248. LONGITUDINAL RATTAN SPRING SEATINGS.

FIG. 3249. PUSHOVER SEAT.
AMERICAN CAR SEAT COMPANY.

FIG. 3250.
VIEW SHOWING CONSTRUCTION OF RATTAN SPRING SEATING.
AMERICAN CAR SEAT COMPANY.

FIG. 3251. SECTIONAL VIEW.
UPHOLSTERED BACK SPRINGS.

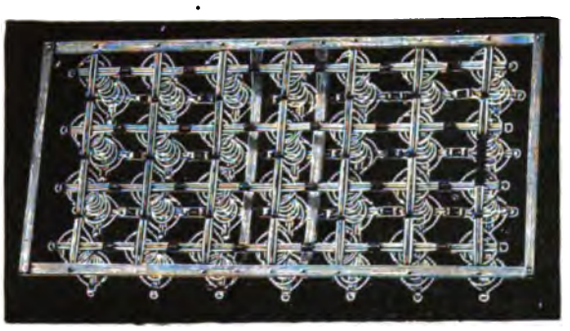


FIG. 3252. SPRING EDGE CUSHION SPRINGS.

FIG. 3253. SECTIONAL VIEW.
UPHOLSTERED CUSHION SPRINGS.

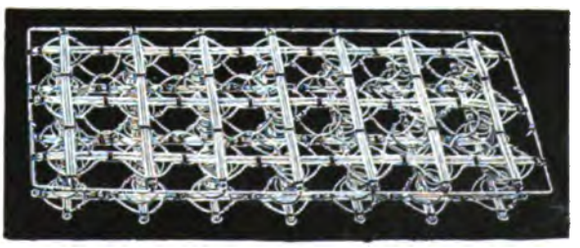
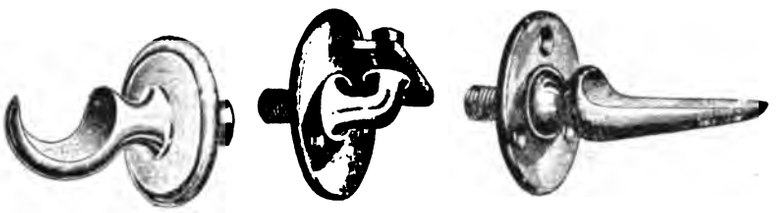


FIG. 3254.
PLAIN SPRINGS FOR CUSHION.

FIG. 3255. REVERSIBLE DOUBLE BORDER SPRING FOR BEDS.
CAR SEATS AND SPRINGS. HEYWOOD BROTHERS & WAKEFIELD CO.



A. & W. A. & W. D. M. Co.
FIGS. 3256-3258. SEAT ARM REST BRACKETS.

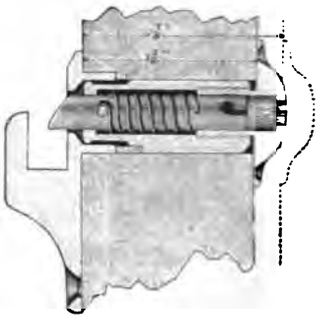
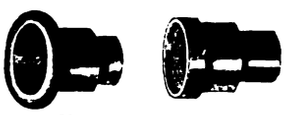


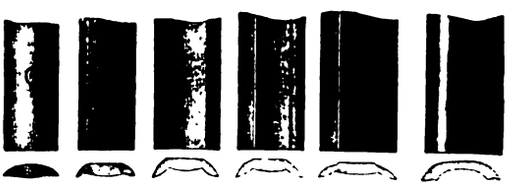
FIG. 3259.
KIRBY'S SEAT LOCK FOR WOOD SEAT ENDS. D. M. CO.

FIGS. 3260-3264.
SEAT ARM CAPS.
A. & W.



FIGS. 3265-3266.
SEAT ARM THIMBLES.
A. & W.

FIG. 3267.
SEAT ARM PIVOT BOLT
D. M. CO.



FIGS. 3268-3279. SEAT BACK MOLDINGS.
D. M. CO.
WHITE METAL FROM ½ IN. FLAT TO ¾ IN. HALF-ROUND.

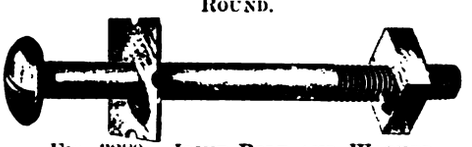
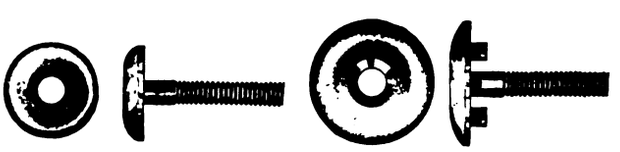


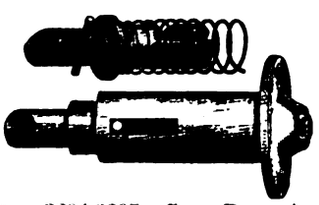
FIG. 3280. JOINT BOLT AND WASHER.
D. M. CO.

FIGS. 3281-3286. SEAT ARM RIVETS. D. M. CO.

D. M. Co. A. & W. A. & W.
FIGS. 3287-3289. SEAT ARM WASHERS.



FIGS. 3290-3293. SEAT ARM WASHERS AND MACHINE BOLTS. D. M. CO.



FIGS. 3294-3295. SEAT BACK ARM LOCK, BOLT AND SPRING.
A. & W.

A. & W. A. & W. D. M. Co.
FIGS. 3296-3298.
SEAT BACK ARM LOCKS WITH ESCUTCHEONS.

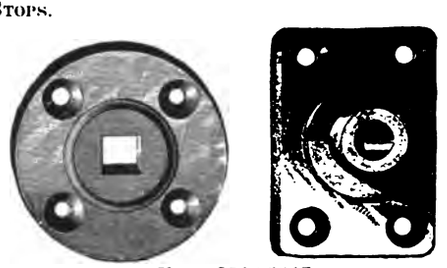
FIGS. 3299-3300. A. & W.
STRAIGHT SEAT ARM STOPS.
A. & W.

D. M. Co. A. & W. A. & W.
FIGS. 3301-3305. CURVED SEAT ARM STOPS.
MADE RIGHT AND LEFT HANDED.

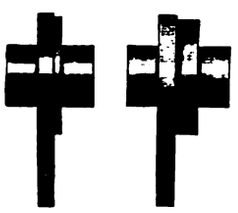
D. M. Co. D. M. Co. A. & W. D. M. Co. A. & W. A. & W.

FIGS. 3306-3311.
SHIELD AND OVAL SHAPED SEAT ARM STOPS.

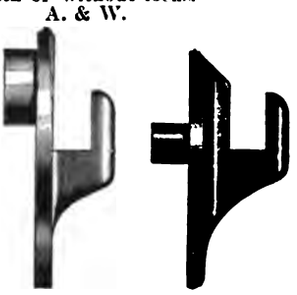
FIGS. 3312-3315.
ROUND SEAT ARM STOPS.
With or without locks.
A. & W.



FIGS. 3316-3317.
SEAT ARM PIVOTS.
D. M. Co.



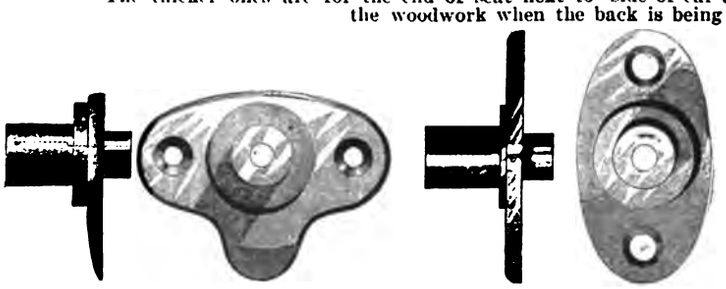
FIGS. 3318-3319.
SEAT ARM PIVOT PLATES.
The thicker ones are for the side of car to prevent the arm from striking the woodwork when the back is being turned.
D. M. Co.



FIGS. 3320-3321.
SEAT ARM STOPS.

FIGS. 3322-3323.
SEAT ARM STOPS.
A. & W.

A. & W. A. & W. FIGS. 3324-3327. A. & W. D. M. Co.
SEAT ARM PIVOT PLATES.
The thicker ones are for the end of seat next to side of car and prevent the arm from striking the woodwork when the back is being turned.



FIGS. 3328-3331. SEAT ARM PIVOT PLATES. D. M. Co.

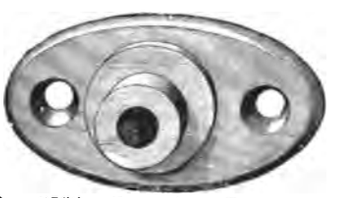
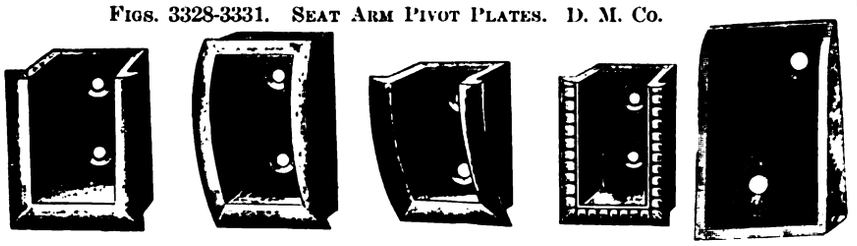
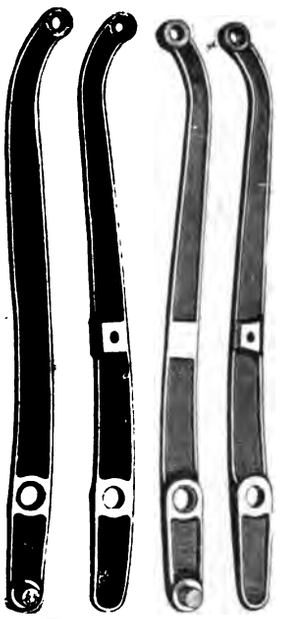


FIG. 3322. SEAT ARM PIVOT PLATE.
WITH SOLID NIPPLE. D. M. Co.



FIGS. 3333-3337. SEAT RAIL BRACKETS OR SOCKETS.
A. & W.

FIG. 3338. SEAT CORNER. SHEET BRASS.
D. M. Co.



FIGS. 3339-3342.
SEAT BACK ARMS FOR FORNEY SEATS.

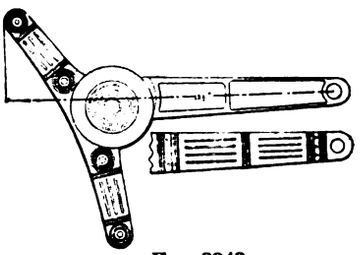
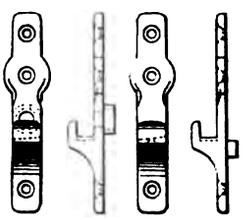


FIG. 3343.
PIVOTED SEAT BACK ARM.
D. M. Co.

FIG. 3345.
SEAT ARM PIVOT PLATE.
A. & W.

FIG. 3344.
CURVED SEAT ARM STOP WITH LOCK.



FIGS. 3346-3349.
WITH LOCK. WITHOUT LOCK.
SEAT ARM STOPS.

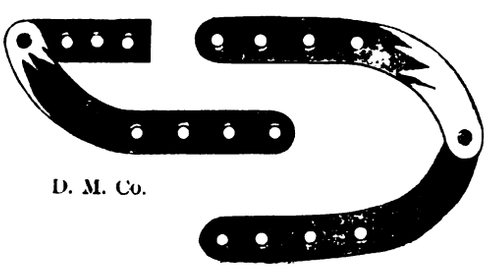
FIGS. 3350-3353. CHAIR AND SOFA CASTERS.
A. & W.

FIG. 3354. SEAT PULL.
A. & W.

FIG. 3355. SEAT PULL.
A. & W.

FIG. 3356.
SEAT HINGE.
D. M. Co.

FIGS. 3357-3358.
SEAT BACK CORNERS.
A. & W.



D. M. Co.

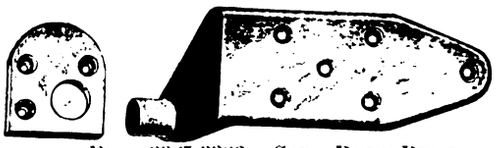
A. & W

FIGS. 3359-3360.
SOFA HINGES.

FIG. 3361. SOFA ARM REST FIXTURE.
D. M. Co.

FIG. 3362.

FIG. 3363. FIG. 3364. SPRING CATCH.
SOFA ARM REST FIXTURES.
D. M. Co.



FIGS. 3365-3366. SOFA BACK PIVOT HINGE AND BUSHING.
D. M. Co.

FIG. 3367.
PIN BUSHING.

FIG. 3368.
PIN PLATE.

FIG. 3369.
CATCH PLATE.

FIG. 3370.
PIN.

SOFA ARM REST FIXTURES.
D. M. Co.

FIGS. 3371-3372.
SOFA BACK LEG SOCKET AND POCKET.
D. M. Co.

FIG. 3373.
SOFA ARM REST BOLT IN POSITION. D. M. CO.

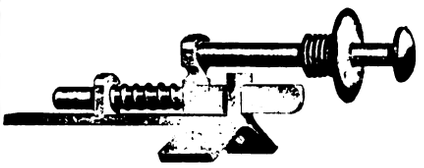


FIG. 3374. SOFA ARM REST BOLT.
D. M. CO.

FIG. 3375. SOFA BOLT.
A. & W.

FIGS. 3376-3377.
BERTH PIVOT SOCKETS.
A. & W.

FIG. 3378.
SOFA LEG HOOK.

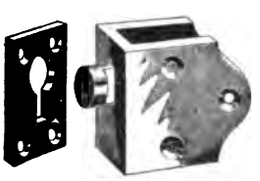
FIGS. 3379-3380.
UPPER BERTH PIVOT SOCKETS.
A. & W.

FIG. 3381.
UPPER BERTH CATCH.
A. & W.

FIG. 3382.
STRIKE PLATE.
A. & W.

FIGS. 3383-3384.
UPPER BERTH CATCH AND PLATE.
A. & W.

FIG. 3385.
SOFA RAIL END AND SOCKET. A. & W.



FIGS. 3386-3387.
HEAD REST PIVOT AND PLATE. A. & W.

FIG. 3388.
BERTH EXTENSION ARMS. A. & W.

FIG. 3389.
HEAD BOARD BOLT.
A. & W.

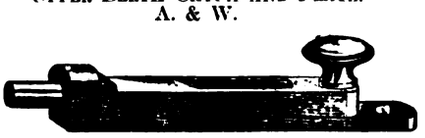
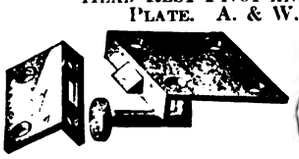
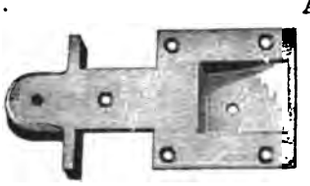


FIG. 3390.
HEAD BOARD FASTENER.
A. & W.



FIGS. 3391-3392.
SEAT BACK POCKET CATCH.



FIGS. 3393-3394. BERTH LOCK PLATE AND BOLT.
A. & W.

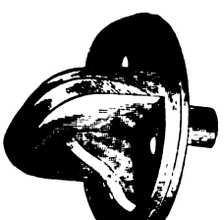


FIG. 3395.
UPPER BERTH BRACKET.

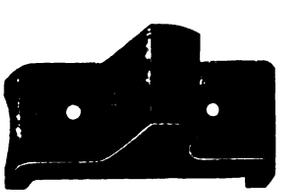
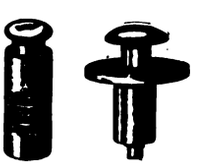


FIG. 3396.
UPPER BERTH REST.
A. & W.

FIG. 3397.
BERTH PIVOT.
A. & W.

FIGS. 3398-3399.
BERTH HEAD REST PIVOT AND PLATE. A. & W.



FIGS. 3400-3401.
BERTH RATTLE STOPS.
A. & W.

FIG. 3402. FOR BEVEL RAIL HEAD. D. M. CO.

FIG. 3403. FOR FLAT RAIL BOARD. A. & W.

HEAD BOARD BUSHINGS.

FIG. 3404. FOR FLAT RAIL BUSHINGS. D. M. CO.

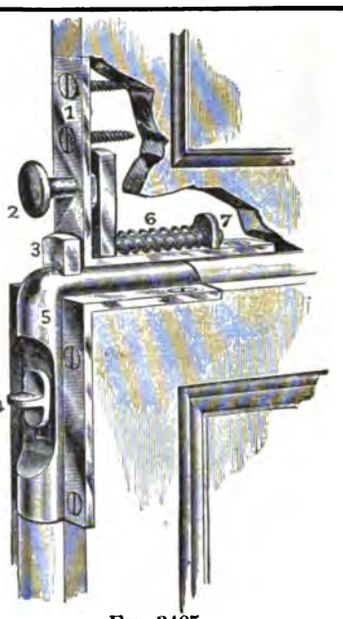


FIG. 3405. HEAD BOARD BOLT AND BUSHING. D. M. CO.

1. *Upper Face Plate*
2. *Knob Latch*
3. *Lower or Fixed Bolt*
4. *Slide Latch*
5. *Lower Face Plate*
6. *Bolt Spring*
7. *Upper or Spring Bolt*

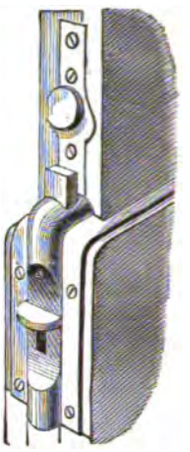


FIG. 3406. HEAD BOARD BOLT. OUTSIDE VIEW.

FIG. 3408. HEAD BOARD COUPLING KEEPER.

FIG. 3407. HEAD BOARD COUPLING.

FIGS. 3409-3410. HEAD BOARD FASTENER. A. & W.

FIGS. 3411-3412. HEAD BOARD BOLT AND BUSHING. A. & W.

FIG. 3413. BERTH HINGE PIVOT. A. & W.

FIGS. 3414-3416. HEAD BOARD PLATES. A. & W.

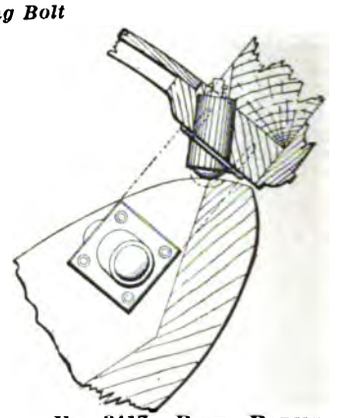


FIG. 3417. BERTH RATTLE STOP. Showing its Application to a Berth.

A. & W.

D. M. CO. FIGS. 3418-3421.

A. & W. BERTH HINGES.

D. M. CO.

FIG. 3422. BERTH HINGE PLATE. A. & W.

FIG. 3423. BERTH HINGE PIVOT.

FIG. 3424. FAST BERTH HINGE.

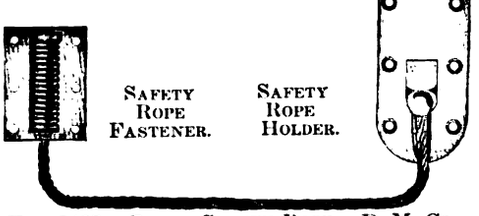
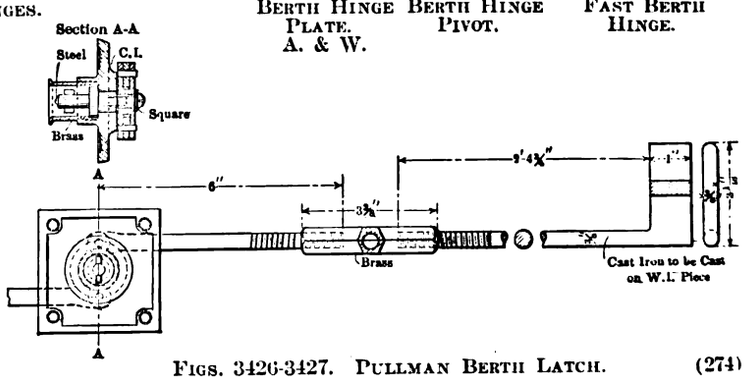


FIG. 3425. BERTH SAFETY ROPE. D. M. CO.



FIGS. 3426-3427. PULLMAN BERTH LATCH.

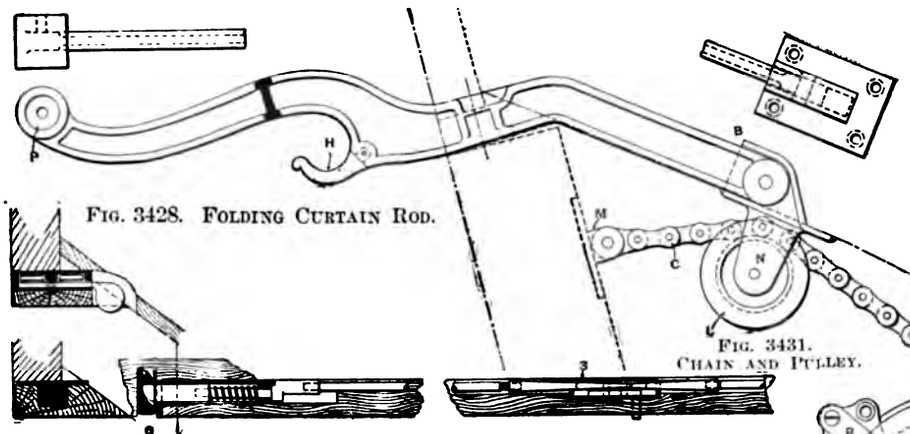


FIG. 3428. FOLDING CURTAIN ROD.

FIG. 3431. CHAIN AND PULLEY.

FIGS. 3429-3430. SECTIONS OF BERTH LATCH.

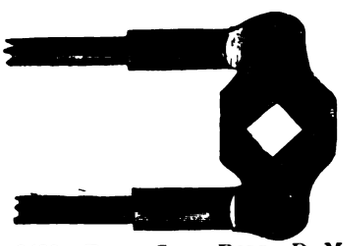


FIG. 3433. BERTH LOCK RODS. D. M. Co.

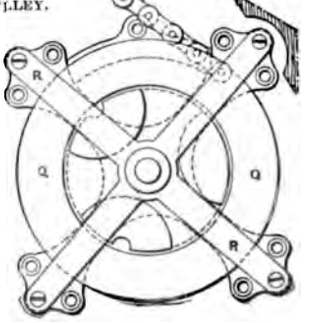


FIG. 3432. BERTH SPRING.

FIG. 3434. BERTH LATCH HANDLE. A. & W.

FIGS. 3435-3436. BERTH LATCH HANDLES. A. & W.

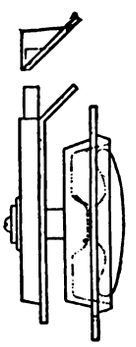


FIG. 3437. SECTION OF LOCK HANDLE.

FIG. 3438. BERTH LATCH HANDLE. A. & W.

FIG. 3439. UPPER BERTH SAFETY STRAP AND HOOK. A. & W.

FIG. 3440. UPPER BERTH SAFETY ROPE HANGER. A. & W.

FIG. 3441. BERTH CURTAIN HOOK.

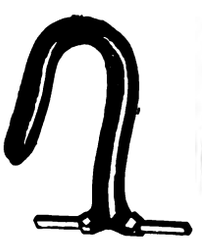
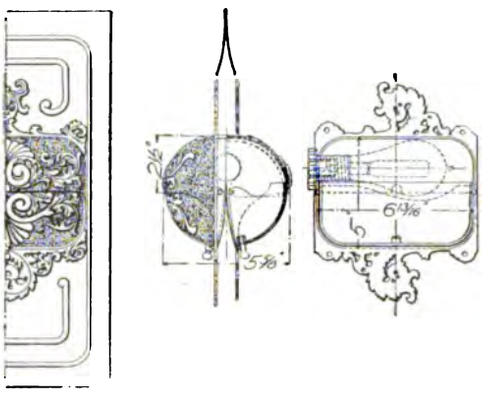


FIG. 3442. BERTH CURTAIN HOOK. D. M. Co.

FIG. 3443. BERTH SAFETY ROPE HOOK. A. & W.

FIGS. 3444-3448. BERTH NUMBERS. D. M. Co.



FIGS. 3449-3451. ELEVATIONS.
GIBBS BERTH LAMP.
D. M. CO.

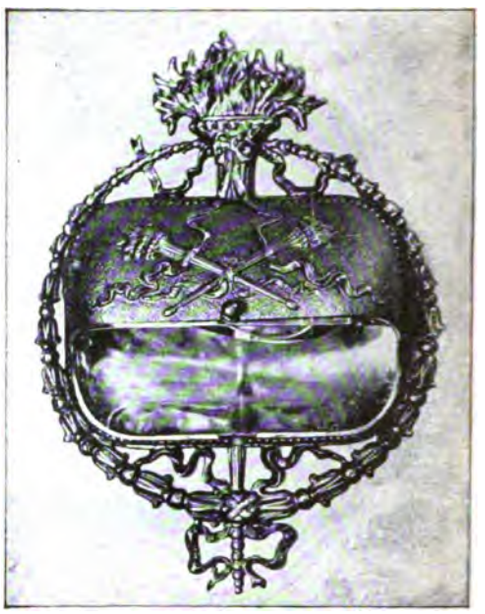


FIG. 3452. GENERAL VIEW.
GIBBS BERTH LAMP.
D. M. CO.

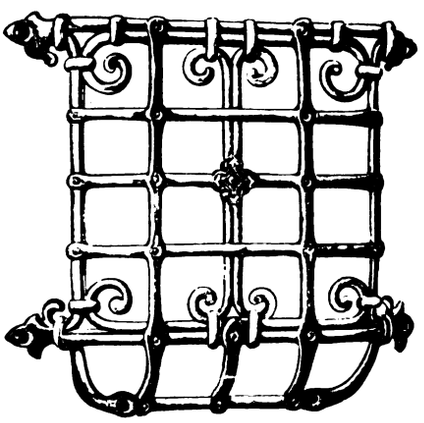


FIG. 3453.
TELEGRAPH BLANK RACK.
A. & W.

FIG. 3454.
PEN RACK.
D. M. CO.

FIGS. 3455-3456.
MATCH BOX HOLDER. MATCH SAFE.
A. & W. A. & W.

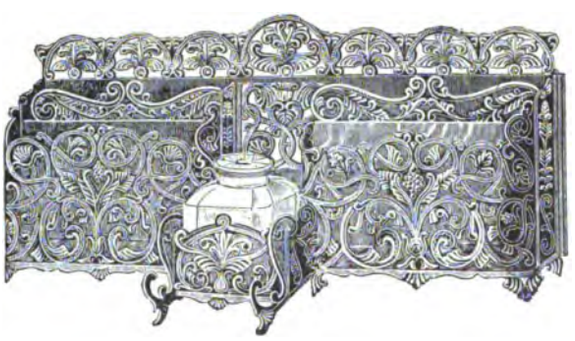


FIG. 3457. PAPER, ENVELOPE AND INK RACK.
D. M. CO.

FIG. 3458. CIGAR AND ASH RECEIVER.

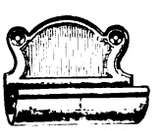


FIG. 3459.
MATCH STRIKER AND
CIGAR HOLDER.
A. & W.

FIG. 3460.
ASH RECEIVER.
A. & W.

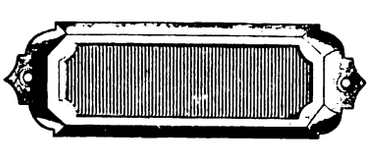


FIG. 3461.
MATCH STRIKER.
A. & W.

FIG. 3462.
MATCH STRIKER.
A. & W.

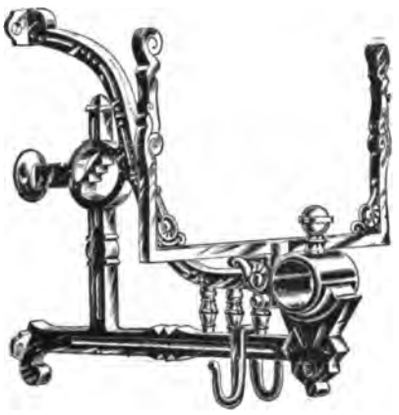


FIG. 3463. A. & W.

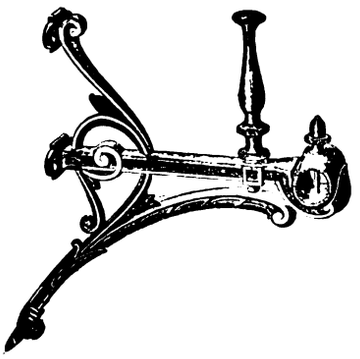


FIG. 3464. A. & W.

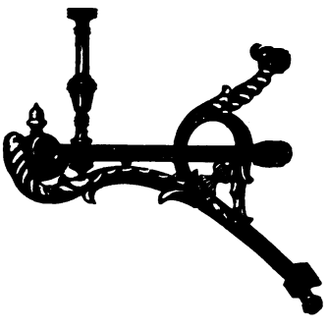


FIG. 3465. A. & W.

FIG. 3466. D. M. Co.

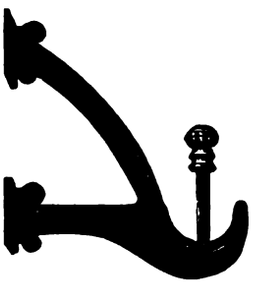


FIG. 3467. A. & W.

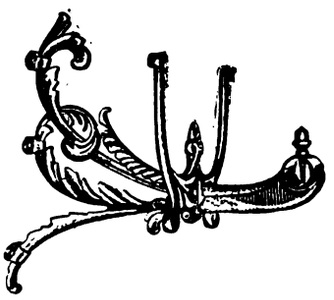


FIG. 3468. A. & W.

FIG. 3469. A. & W.

BERTH CURTAIN ROD BRACKETS.

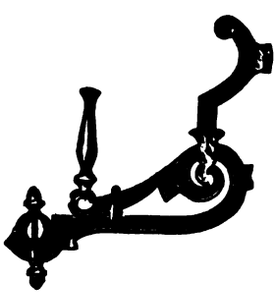


FIG. 3470.
BERTH CURTAIN ROD BRACKET.
A. & W.

FIG. 3471.
MATCH BOX HOLDER.
A. & W.

FIG. 3472.
TABLE LEG HOOK.
A. & W.

FIGS. 3473-3474.
TABLE HOLDER AND PLATE.
A. & W.

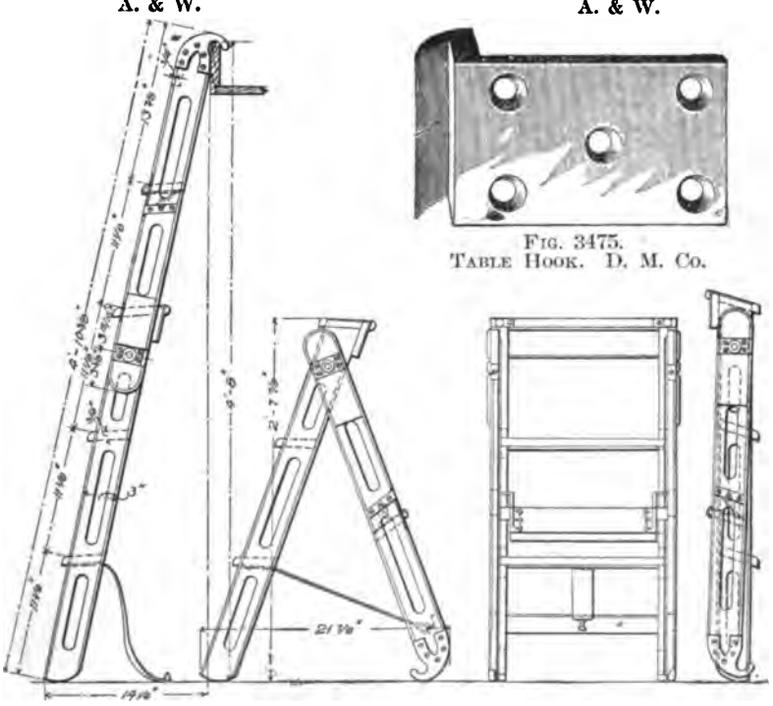


FIG. 3475.
TABLE HOOK. D. M. Co.

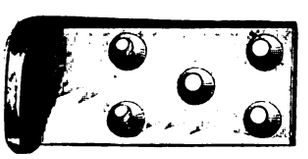


FIG. 3476.
TABLE HOOK. D. M. Co.

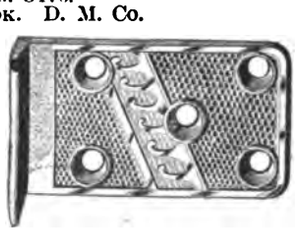


FIG. 3477.
TABLE HOOK. D. M. Co.

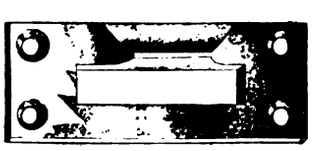


FIG. 3478.
TABLE HOOK PLATE. D. M. Co.

 FIGS. 3479-3482. STEP LADDER FOR SLEEPING CARS.

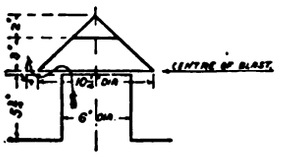


FIG. 3483. THE CONE CAP.

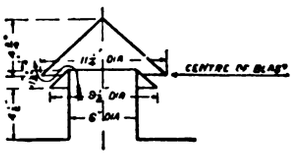


FIG. 3484. THE CONE AND APRON.

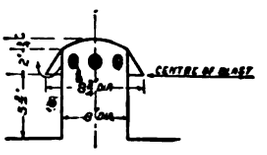


FIG. 3485. THE CANOPY.

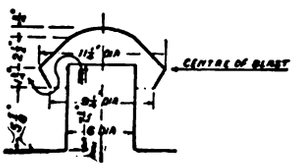


FIG. 3486. THE TORNADO CANOPY.

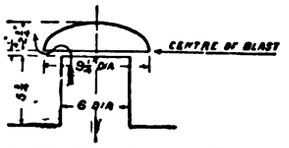


FIG. 3487. THE DISHED CAP.

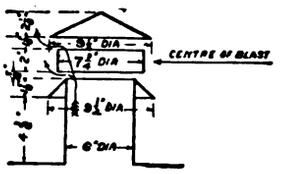


FIG. 3488. THE MOORE.

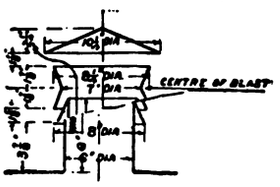


FIG. 3489. THE DUPLEX.

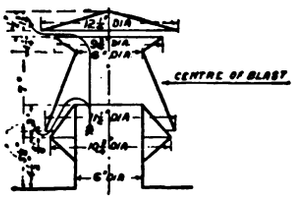


FIG. 3490. THE ROE.

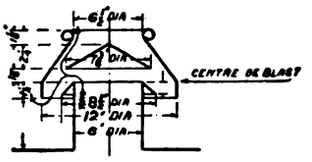


FIG. 3491. THE STASCH.

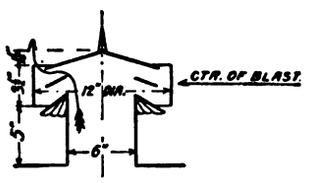


FIG. 3492. THE STAR.

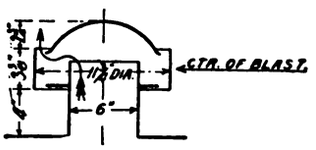


FIG. 3493. THE WORLD.

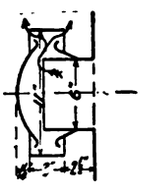


FIG. 3494.
THE GLOBE HORIZONTAL.

FIG. 3495.
THE GLOBE.

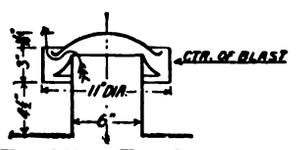


FIG. 3496. THE GLOBE ERECT.

FIGS. 3497-3498. THE DEFLECTOR.

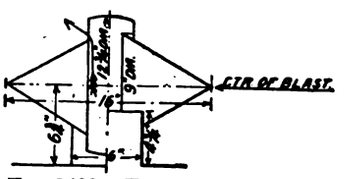
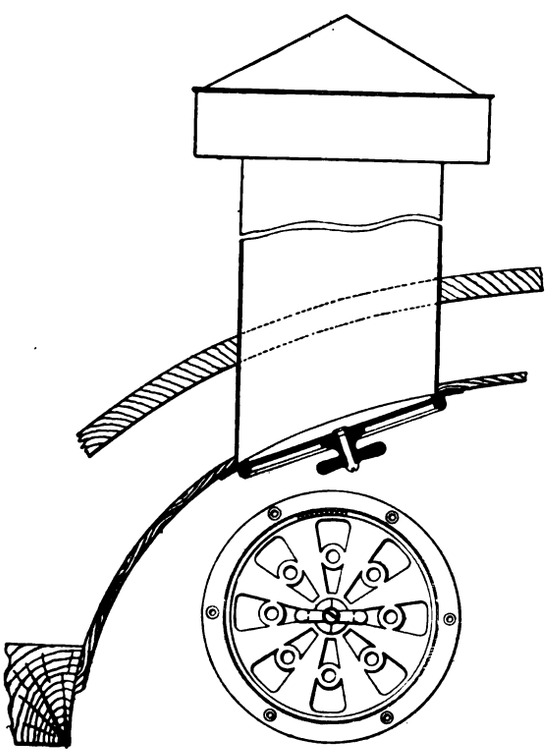
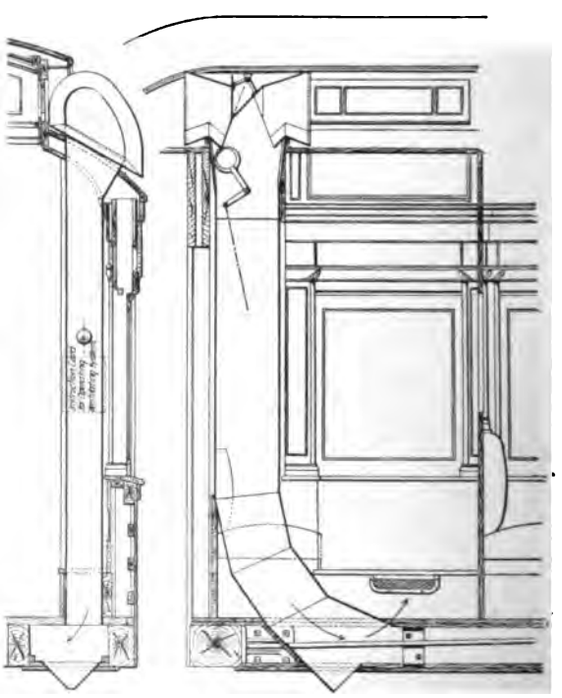


FIG. 3499. THE TORPEDO.



FIGS. 3500-3501. VENTILATOR FOR SALOONS.



FIGS. 3502-3503.
SYSTEM OF VENTILATING PASSENGER CARS.
P. R. R.

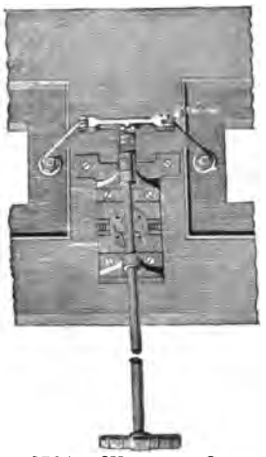


Fig. 3504. Windows Closed.

Fig. 3505. One Window Open.
Mansfield Deck Sash Opener.
A. & W.

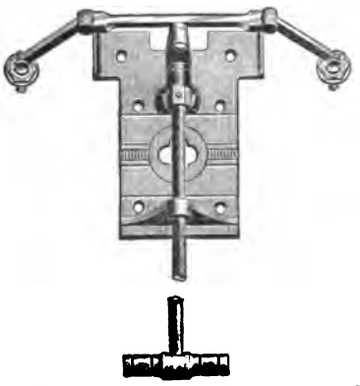
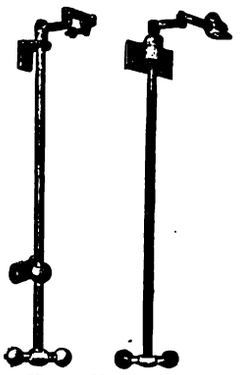


Fig. 3506. Opener Complete.



Figs. 3507-3508.
Deck Sash Opener. D. M. Co.
Transom Opener. D. M. Co.

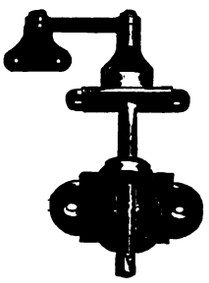


Fig. 3509. Lauder Monitor.

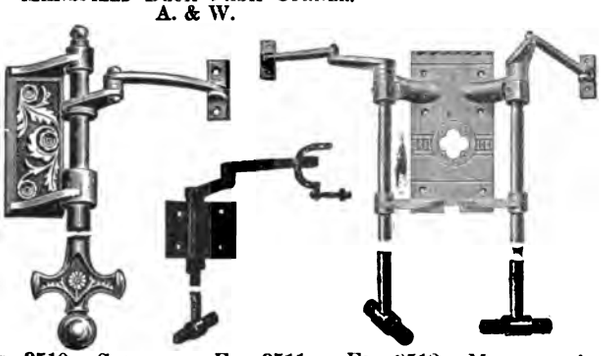


Fig. 3510. Single. Decorated.
Fig. 3511. Single, Plain.
Fig. 3512. Mansfield's Improved.
Deck Sash Openers. A. & W.

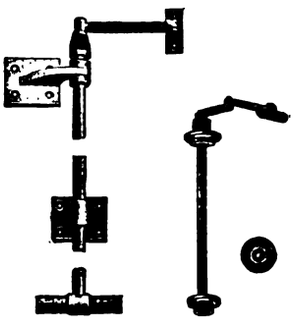
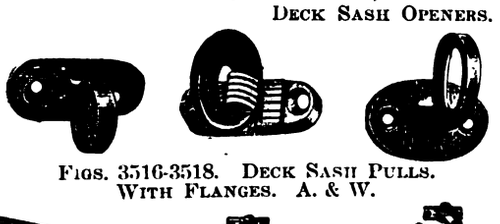
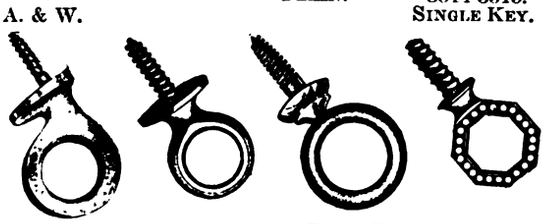


Fig. 3513. Single, Plain.
Figs. 3514-3515. Single Key.



Figs. 3516-3518. Deck Sash Pulls. With Flanges. A. & W.



Figs. 3519-3522. Deck Sash Pulls. With Screws. A. & W.

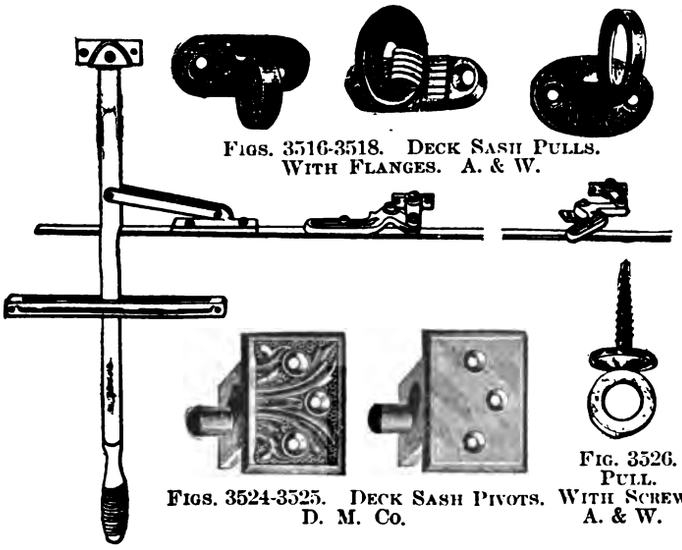
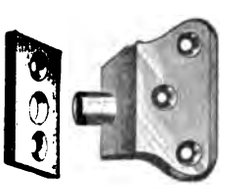


Fig. 3523. Continuous Deck Sash Opener.

Figs. 3524-3525. Deck Sash Pivots. D. M. Co.

Fig. 3526. Pull. With Screw. A. & W.

Fig. 3527. Deck Sash Pivot. A. & W.



Figs. 3528-3529.

Fig. 3530.

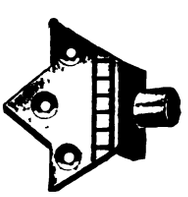


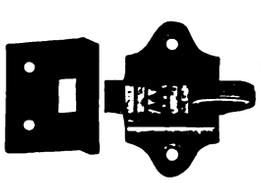
Fig. 3531.

Fig. 3532.

Fig. 3533.

Fig. 3534.

Deck Sash Pivots and Plates. A. & W.



Figs. 3535-3536.

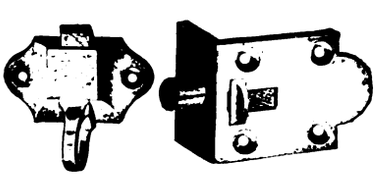


Fig. 3537.
Fig. 3538.

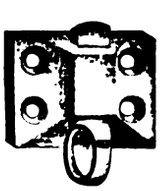


Fig. 3539.

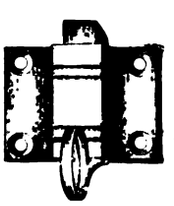


Fig. 3540.

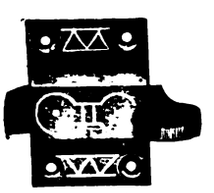
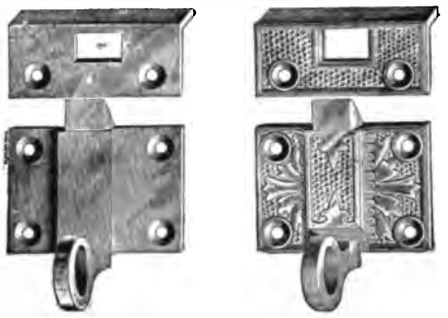
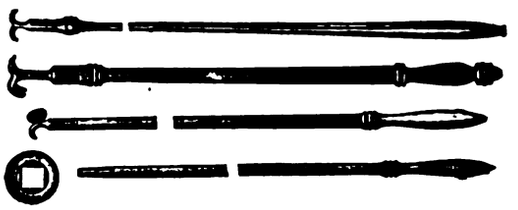


Fig 3541.

Deck Sash and Transom Catches. A. & W.



FIGS. 3542-3545.
DECK SASH CATCHES.
D. M. CO.

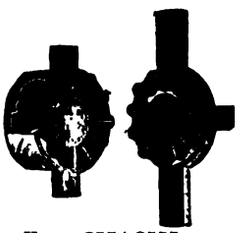


FIGS. 3546-3550.
PULL HOOKS OR DECK SASH OPENERS.
A. & W.

FIG. 3551.

FIG. 3552.
DECK SASH CATCHES
A. & W.

FIG. 3553.



FIGS. 3554-3555.
LOWER RATCHET PLATE AND RATCHET SPRING. UPPER RATCHET PLATE.

FIGS. 3556-3557.
RATCHET CLAMP. PIVOT.
MORGAN AUTOMATIC DECK SASH PIVOT AND CLAMP.
A. & W.

FIG. 3558.

FIG. 3559.

FIG. 3560.

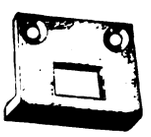


FIG. 3561.
DECK SASH CATCH PLATES OR STRIKE PLATES.
A. & W.

FIG. 3562.
DECK SASH CIRCLE PLATE.
D. M. CO.

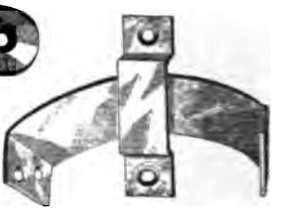
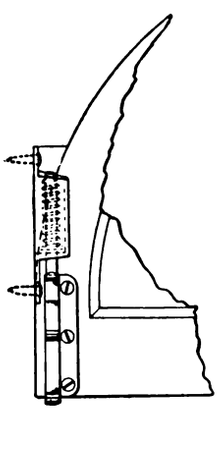
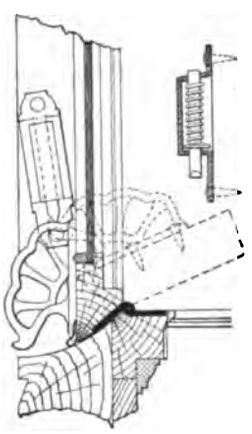


FIG. 3563.
DECK SASH QUADRANT AND CLIP.
A. & W.





FIGS. 3564-3565. SECTIONAL ELEVATIONS.
PULLMAN DECK SASH PIVOT AND RATCHET CATCH.

FIG. 3566.
DECK SASH SOCKET AND SPRING, AND RATCHET CATCH.

FIG. 3567.
DECK SASH STOP HINGE.
D. M. CO.

FIG. 3568.
DECK SASH QUADRANT AND CLIP.
A. & W.

FIG. 3569.
RATCHET PLATE.
"MONITOR" DECK SASH PIVOT AND RATCHET CATCH.
D. M. CO.

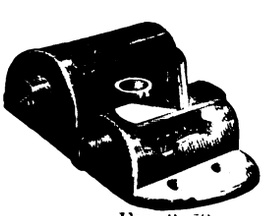


FIG. 3570.
PIVOT AND RATCHET BOLT.

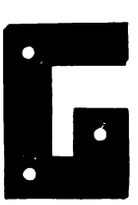


FIG. 3571.
DECK SASH DOUBLE RATCHET AND RATCHET PLATE (LEFT HAND).
A. & W.

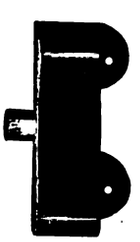
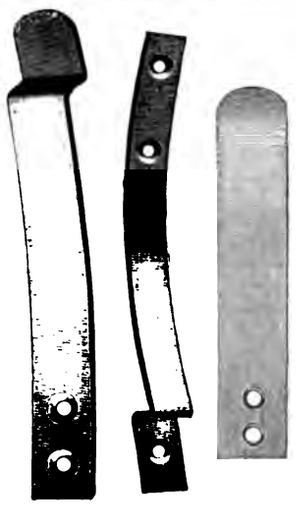


FIG. 3572.

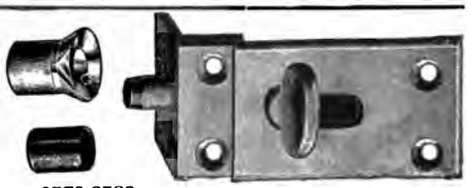
FIG. 3573.
TRANSOM SASH STOP.
A. & W.

FIG. 3574.
DECK SASH PIVOT AND RATCHET.
A. & W.



Figs. 3575-3577.
Sash and Blind Springs.
A. & W.

Fig. 3578. Blind Bolt.
A. & W.



Figs. 3579-3580.
Blind
Bolt Bushing.
A. & W.

Fig. 3581.
Blind Bolt. A. & W.

Fig. 3582.
Lower Window Blind Pull or Lift.
A. & W.

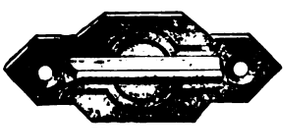


Fig. 3583.
Upper Window Blind Pull or Lift.
A. & W.

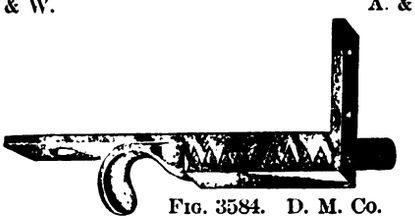


Fig. 3584. D. M. Co.

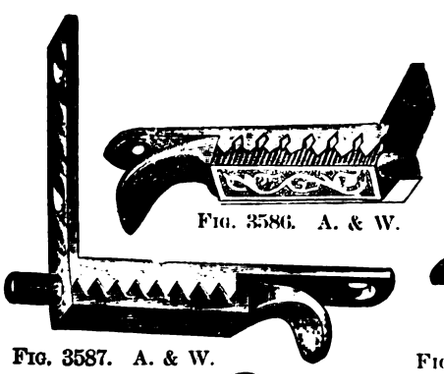


Fig. 3587. A. & W.

Fig. 3586. A. & W.

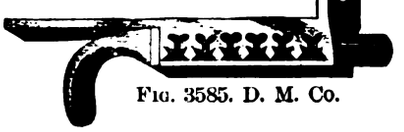


Fig. 3585. D. M. Co.

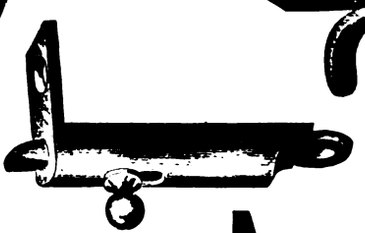


Fig. 3588. A. & W.

Fig. 3589. D. M. Co.

Fig. 3590. D. M. Co.

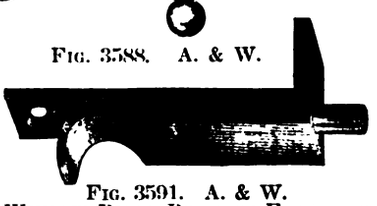


Fig. 3591. A. & W.
Window Blind Bolts or Fasteners.

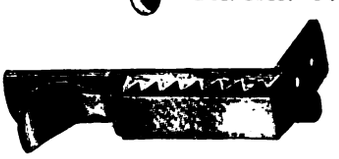
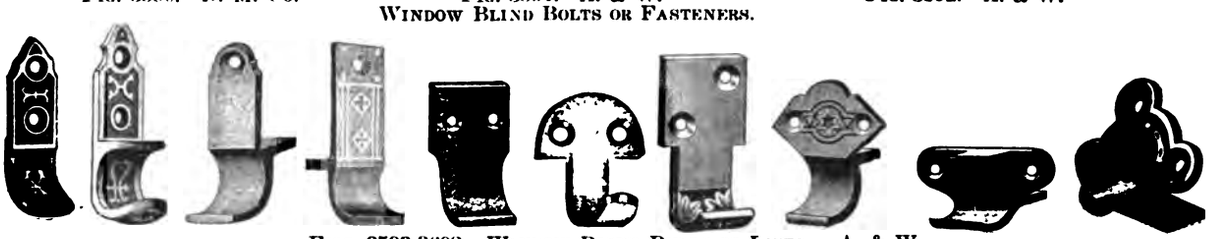


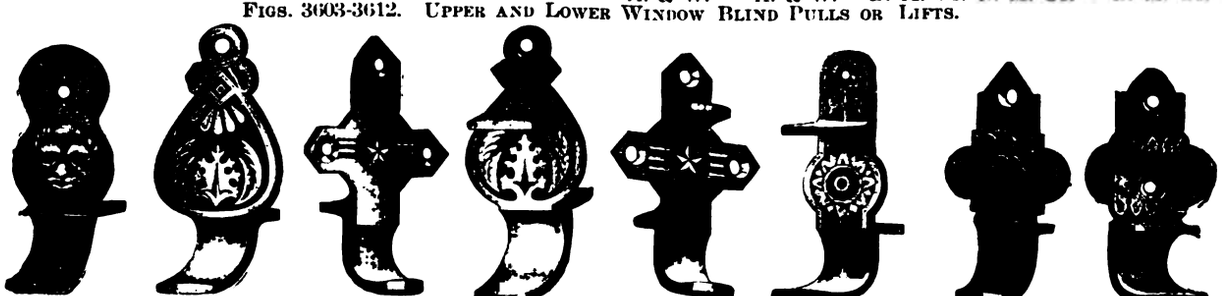
Fig. 3592. A. & W.



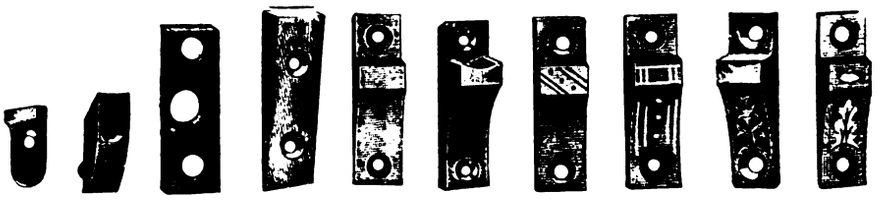
Figs. 3593-3602. Window Blind Pulls or Lifts. A. & W.

A. & W. A. & W. D. M. Co. A. & W. A. & W. A. & W. A. & W. D. M. Co. D. M. Co. D. M. Co.

Figs. 3603-3612. Upper and Lower Window Blind Pulls or Lifts.

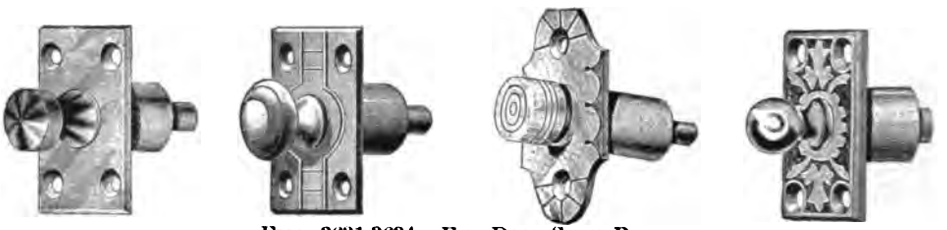


Figs. 3613-3620. Upper and Lower Window Blind Pulls or Lifts. A. & W.
A Lower Window Blind Pull has a projecting Flange to support the Upper Blind.



D.M.Co. D.M.Co. D.M.Co. D.M.Co. A.&W. A.&W. A. & W. A. & W. D.M.Co. A.&W.

FIGS. 3621-3630. SASH AND BLIND LOCK STOPS.



FIGS. 3631-3634. END DOOR SASH BOLTS.

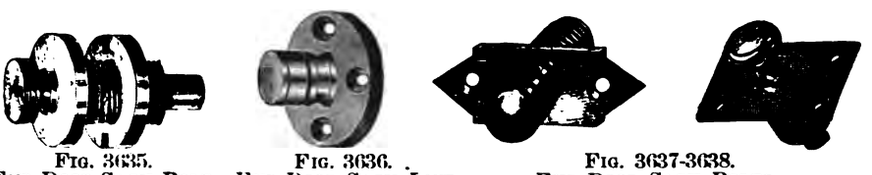
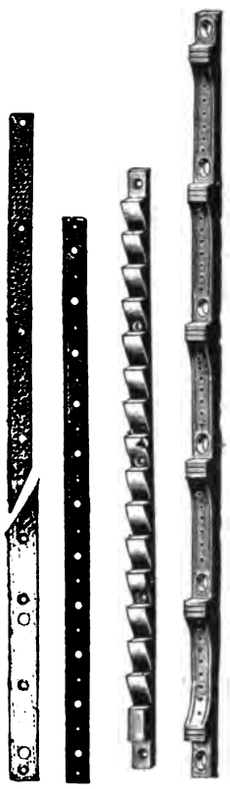


FIG. 3635. END DOOR SASH BOLT. A. & W.

FIG. 3636. END DOOR SASH LIFT.

FIG. 3637-3638. END DOOR SASH BOLTS.



FIGS. 3639-3643. END DOOR SASH BOLT PLATES. RATCHET SASH AND BLIND LOCK STOPS. A. & W.

FIGS. 3644-3645. SASH BARS. D. M. CO.

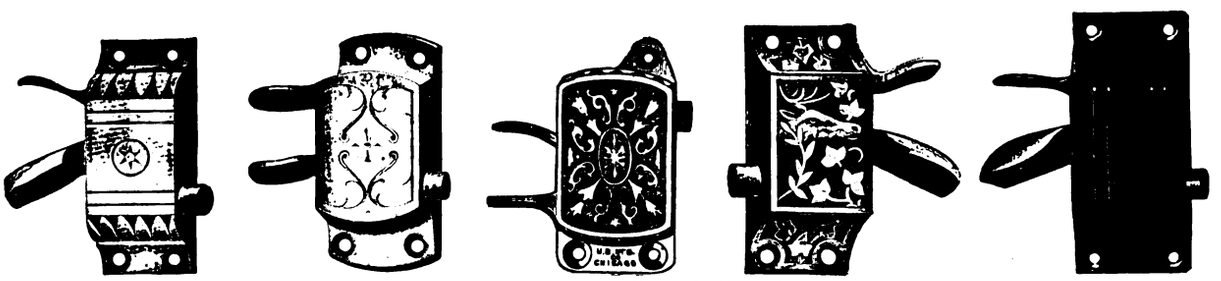
FIG. 3646. SASH LOCK.

FIG. 3647. SASH LOCK.

FIG. 3648. BACK VIEW. SASH LOCK.

FIGS. 3649-3651. WINDOW SASH LOCKS. A. & W.

FIGS. 3652-3656. WINDOW SASH LOCKS. A. & W.



FIGS. 3657-3658.

FIGS. 3659-3660. WINDOW SASH LOCKS. A. & W.

FIG. 3661.

A. & W. D. M. Co. D. M. Co. A. & W. A. & W. A. & W.

Figs. 3662-3667. Window Sash Lifts, Cone Top.

Figs. 3668-3672. Window Sash Lifts, Cone and Straight Top.

Figs. 3673-3675. Window Sash Lifts, Straight Top. A. & W.

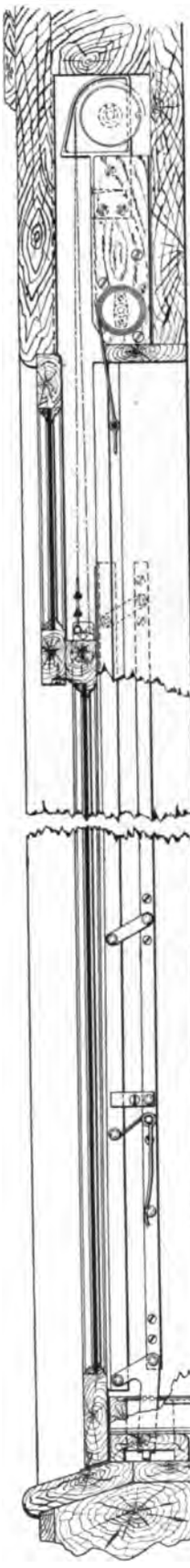
Figs. 3676-3678. Window Sash Lifts, Straight Top. A. & W.

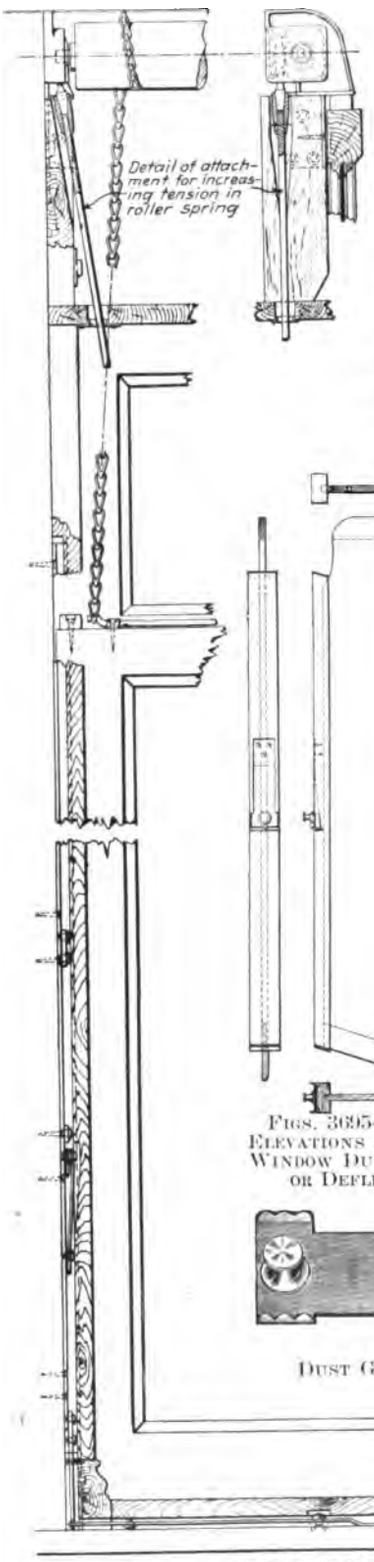
Figs. 3679-3681. Window Sash Lifts. A. & W.

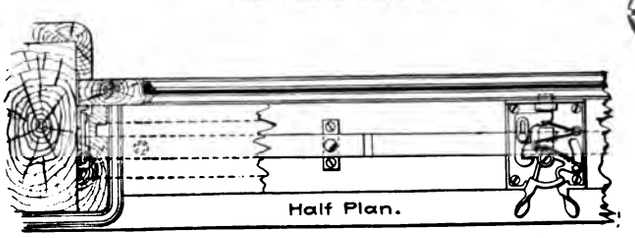
Figs. 3682-3684. Window Sash Lifts, Mortise. A. & W.

Figs. 3685-3687. Window Sash Lifts. A. & W.

Figs. 3688-3690. Window Sash Lifts, Bar Pattern. A. & W.







Figs. 3691-3694. Details of Edwards' Automatic Window Sash Balance. The O. M. Edwards Co.

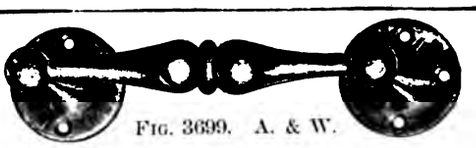


Fig. 3699. A. & W.

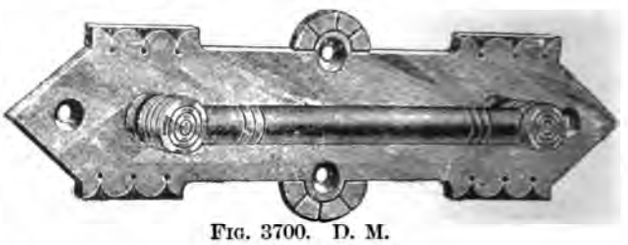


Fig. 3700. D. M.

Fig. 3701. A. & W.

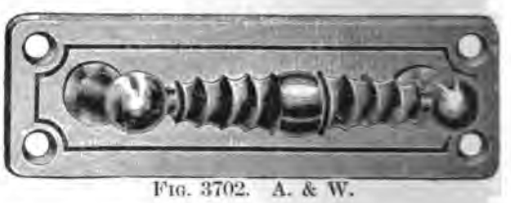
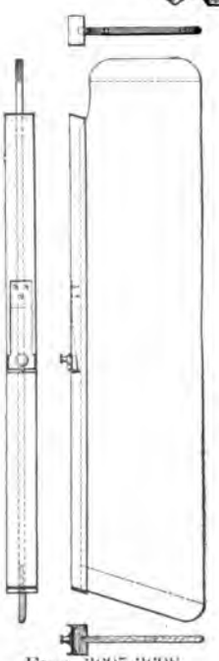


Fig. 3702. A. & W.

Fig. 3703. A. & W.
Figs. 3699-3703. Window Sash Lifts, Bar Pattern.



Figs. 3695-3698.
Elevations and Plans, Window Dust Guard or Deflector.

Fig. 3704
Dust Guard Spring Holder.

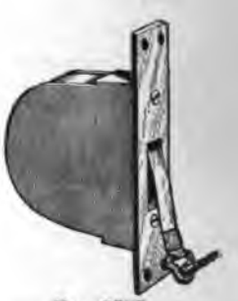


Fig. 3705.
The Caldwell Window Sash Balance.

Figs. 3706-3707.
Storm Sash Fastener. A. & W.

FIG. 3708.
NATIONAL SASH LOCK.

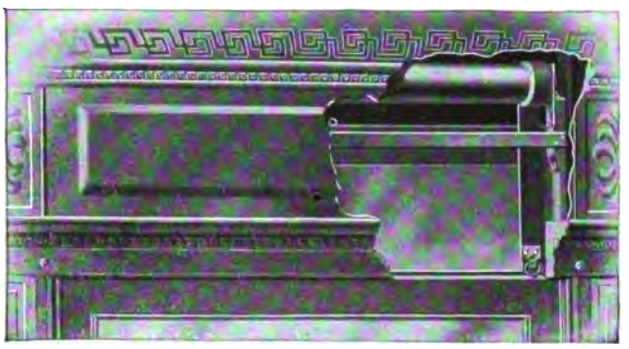


FIG. 3709. NATIONAL SASH BALANCE.

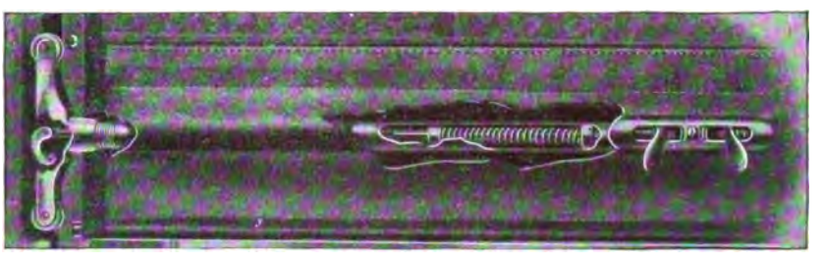


FIG. 3710. NATIONAL CURTAIN FIXTURE.
THE NATIONAL LOCK WASHER CO., MAKERS.

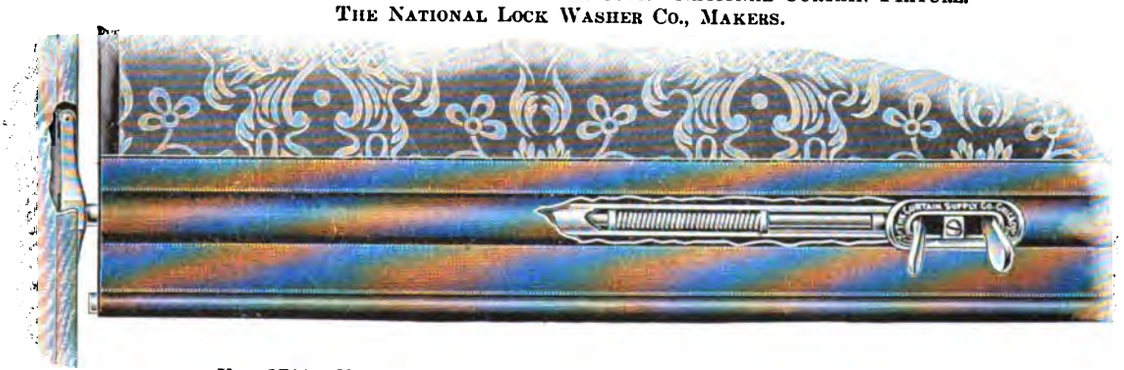


FIG. 3711. FORSYTH NO. 84 CURTAIN FIXTURE WITH ROLLER TIPS.

FIG. 3712.
FORSYTH NO. 84 ROLLER TIP CURTAIN WITH FRONT HANDLES AND WIRED APRON BOTTOM.

FIG. 3713.
BURROWES NO. 43 CURTAIN WITH DROP HANDLES AND REGULAR APRON BOTTOM.

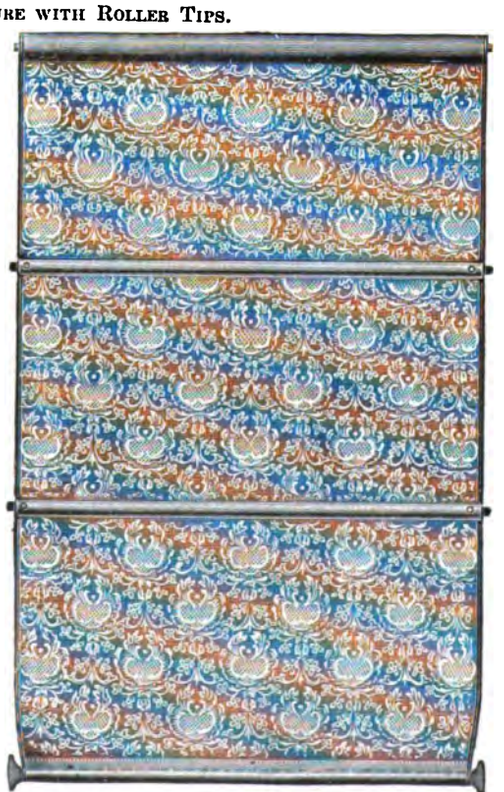
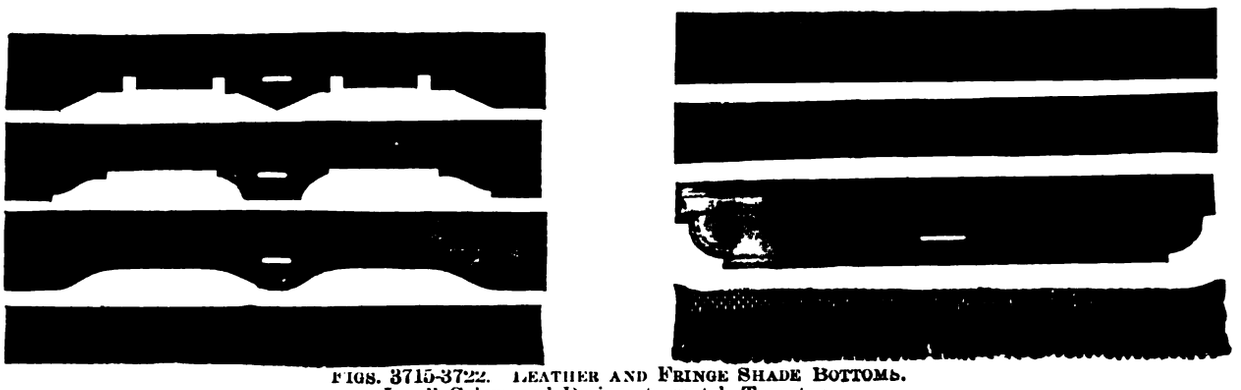


FIG. 3714.
ACME OPEN STREET CAR CURTAIN, NO. 471, WITH REGULAR BOTTOM.

THE CURTAIN SUPPLY CO., MAKERS.



Figs. 3715-3722. Leather and Fringe Shade Bottoms.
In all Colors and Designs to match Tapestry.

Fig. 3723.
Lambrequin and Shades for Parlor Car.
Hale & Kilburn Mfg. Co.

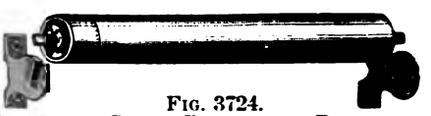
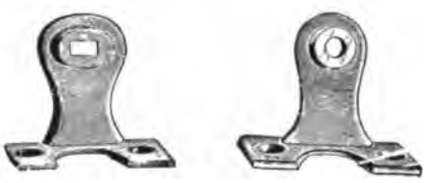


Fig. 3724.
Hartshorn Shade Roller and Brackets, Showing Centrifugal Pawls.
(The McKay shade roller is somewhat similar, but uses a cam instead of a pawl.)



Figs. 3725-3726.
McKay's Curtain Brackets, No. 1.

Figs. 3727-3728.
McKay's Curtain Brackets, No. 2.

Names of Parts of Car Trucks, Freight, Figs. 3735-3737, 3745-3753; Passenger, Figs. 3781-3783, 3948-3951.

1. *Wheel*
2. *Axle*
3. *Journal Box*
4. *Journal Box Lid*
5. *Pedestal*
6. *Pedestal Tie Bar*
7. *Pedestal Stay Rod*
8. *Pedestal Brace*
8'. *Pedestal Brace Tie Bar*
10. *Wheel Piece*
11. *Outside Wheel Piece Plate*
12. *Inside Wheel Piece Plate*
13. *Wheel Piece Truss Rod*
14. *Arch Bar*
15. *Inverted Arch Bar*
16. *Auxiliary Arch Bar*
17. *End Piece of Truck Frame; Bolster End Cap (fig. 3735)*
20. *Transom*
21. *Middle Transom for Six Wheeled Truck*
22. *Outside Transom for Six Wheeled Truck*
23. *Transom Tie Bar*
24. *Transom Truss Rod*
25. *Transom Truss Block*
26. *Transom Truss Rod Washer*
27. *Transom Chafing Plate*
28. *Transom Casting*
29. *Transom Pillar*
30. *Truck Bolster*
36. *Truck Bolster Chafing Plate*
37. *Bolster Guide Bars or Truck Columns*
40. *Lateral Motion Spring*
41. *Lateral Motion Spring Pin*
42. *Spring Beam*
43. *Spring Plank*
44. *Spring Plank Bearing*
45. *Spring Plank Safety Strap*
46. *Swing Hangers*
47. *Upper Swing Hanger Pivot*
48. *Lower Swing Hanger Pivot*
49. *Swing Hanger Pivot Bearing*
50. *Swing Hanger Friction Block*
51. *Safety Beam*
52. *Middle Safety Beam*
53. *Safety Beam Block*
54. *Axle Safety Bearing*
55. *Axle Safety Strap*
56. *Axle Safety Bearing Thimbles*
59. *Safety Beam Tie Rod*
60. *Safety Beam Iron*
61. *Truck Side Bearing*
62. *Side Bearing Bridge*
63. *Truck Center Plate*
64. *Center Plate Block*
65. *Center Bearing Beam*
66. *Center Bearing Arch Bar*
67. *Center Bearing Inverted Arch Bar*
68. *Check Chain*
69. *Truck Check Chain Hook*
70. *Truck Check Chain Eye*
71. *Equalizing Bar*
72. *Equalizing Bar Spring Cap*
73. *Equalizing Bar Spring Seat*
74. *Bolster Spring Seat*
75. *Bolster Spring Cap*
76. *Spring Block*
78. *Journal Spring*
79. *Equalizing Bar Spring*
80. *Bolster Spring*
81. *Truck Frame Knee Iron*
83. *Brake Head*
84. *Brake Beam*
85. *Brake Eye Bolt*
86. *Brake Hanger*
87. *Brake Hanger Carrier*
88. *Brake Beam Safety Chain*
89. *Brake Safety Chain Eye Bolt*
90. *Brake Safety Strap*
91. *Release Spring*
92. *Brake Lever*
93. *Brake Lever Fulcrum*
94. *Brake Lever Guide*
95. *Brake Lever Stop*
96. *Brake Lever Sheave*
97. *Lower Brake Rod*
98. *Brake Shoe*
104. *King Bolt or Center Pin*
108. *Journal Box Bolts*
109. *Column Bolts*
111. *Journal*
112. *Journal Bearing*
114. *Stop Plate*
115. *Dust Guard*
120. *Brake Beam Adjusting Hanger Carrier*
121. *Brake Beam Adjusting Hanger*
123. *Brake Beam Adjusting Hanger Clip*
124. *Brake Beam Adjusting Hanger Plate; Angle Frame Tie Bars (figs. 3745-53)*
130. *End Piece Corner Plate*
131. *Transom Corner Plate*

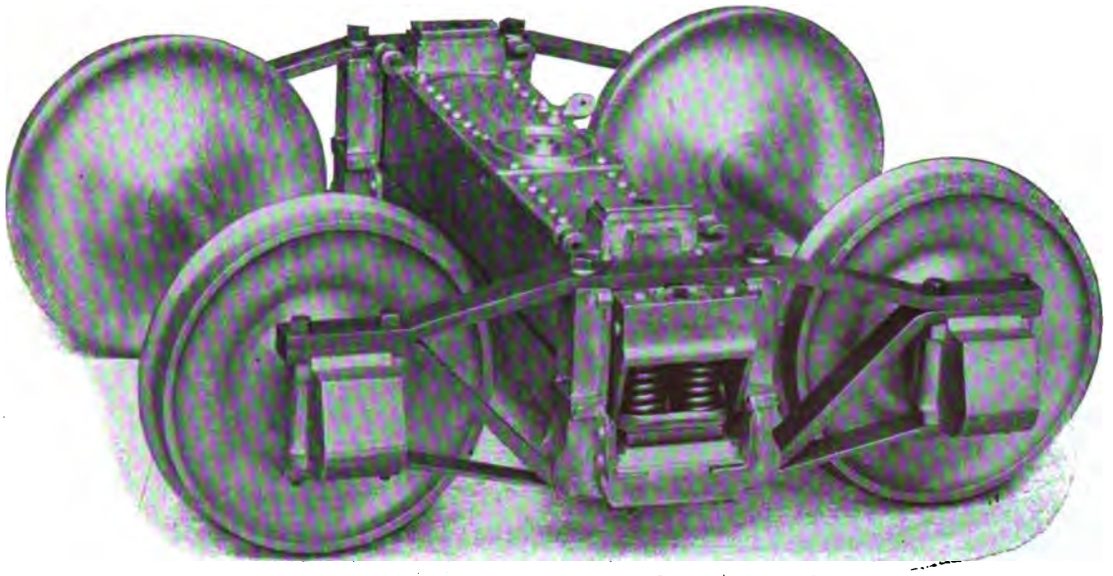


FIG. 3729. DIAMOND ARCH BAR TRUCK WITH BARBER ROLLER SIDE BEARINGS.
STANDARD CAR TRUCK CO., MAKERS.

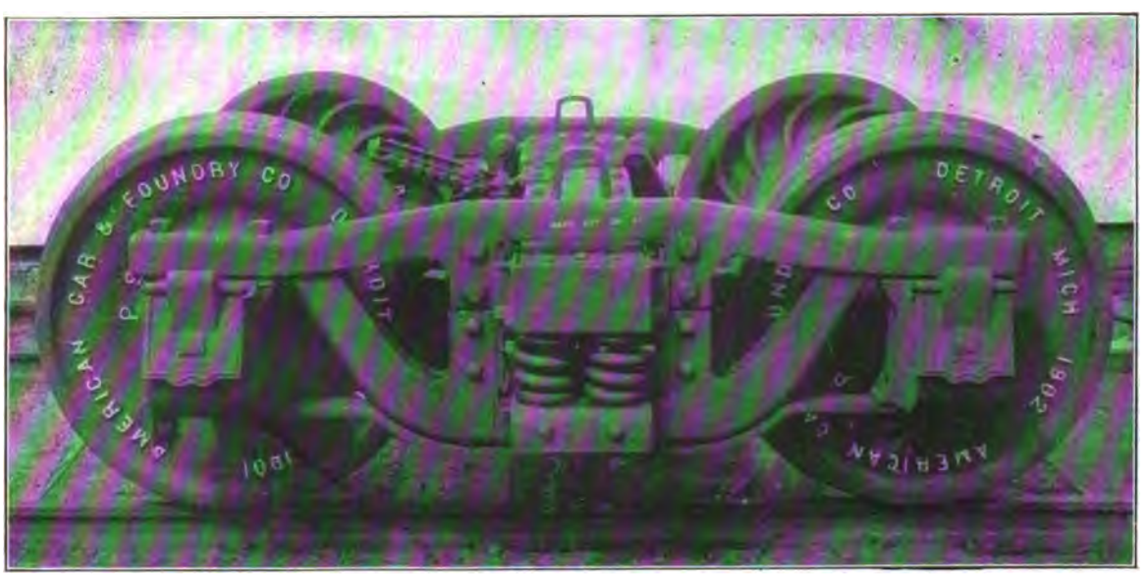


FIG. 3730. HASKELL PRESSED STEEL ARCH BAR TRUCK.
AMERICAN CAR & FOUNDRY CO., MAKERS.

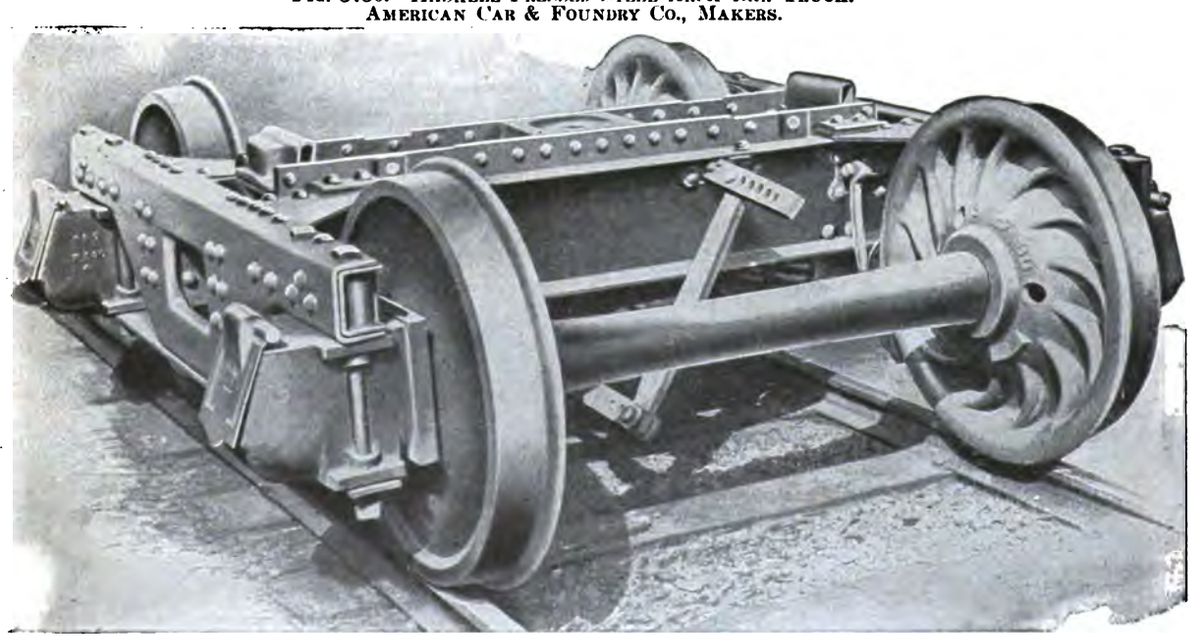


 FIG. 3731. BUCKEYE PRESSED STEEL TRUCK. PRESSED STEEL CAR CO., MAKERS.

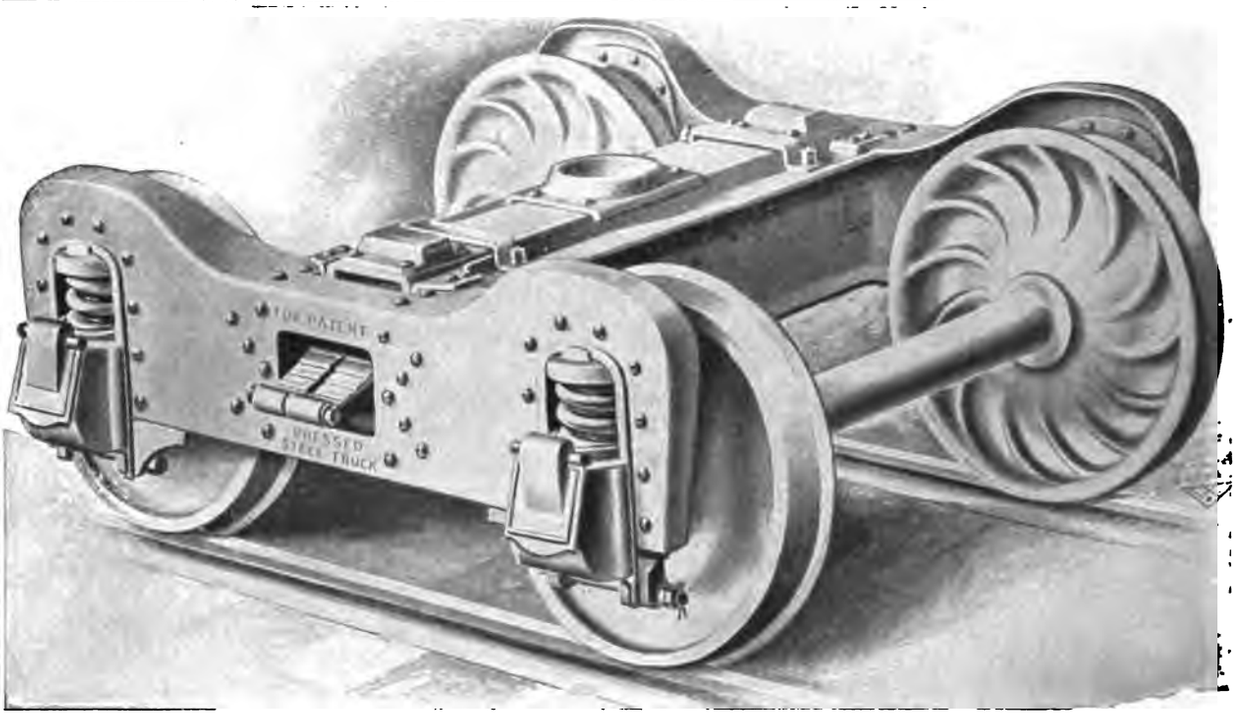


FIG. 3732. FOX PRESSED STEEL TRUCK. PRESSED STEEL CAR CO., MAKERS.

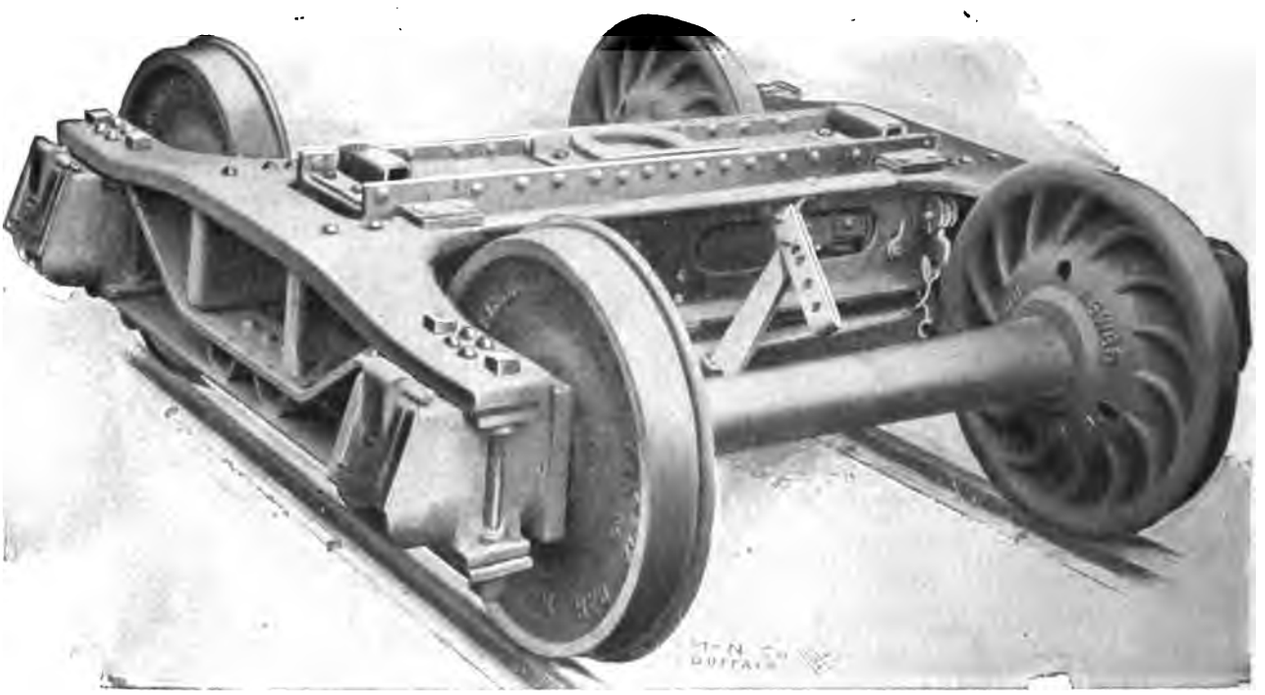


FIG. 3733. PRESSED STEEL DIAMOND ARCH BAR TRUCK. PRESSED STEEL CAR CO., MAKERS.

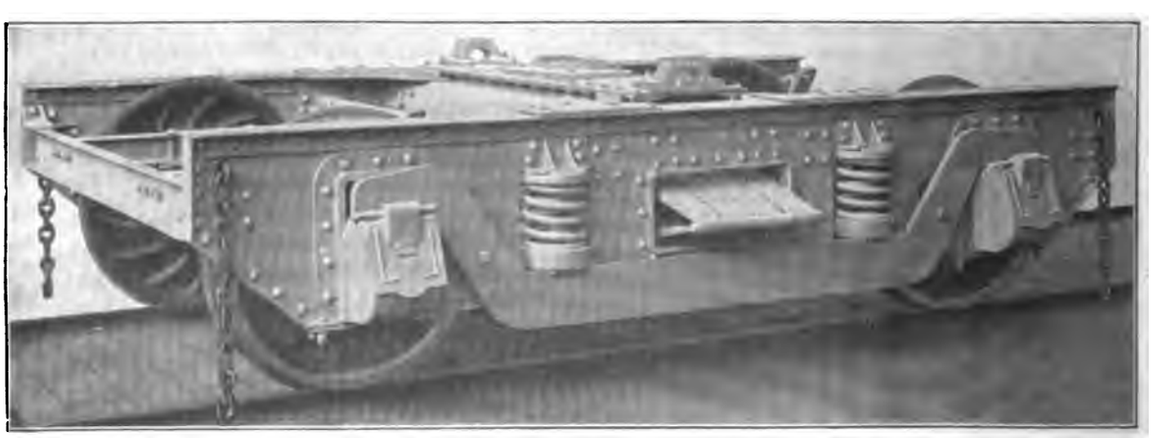
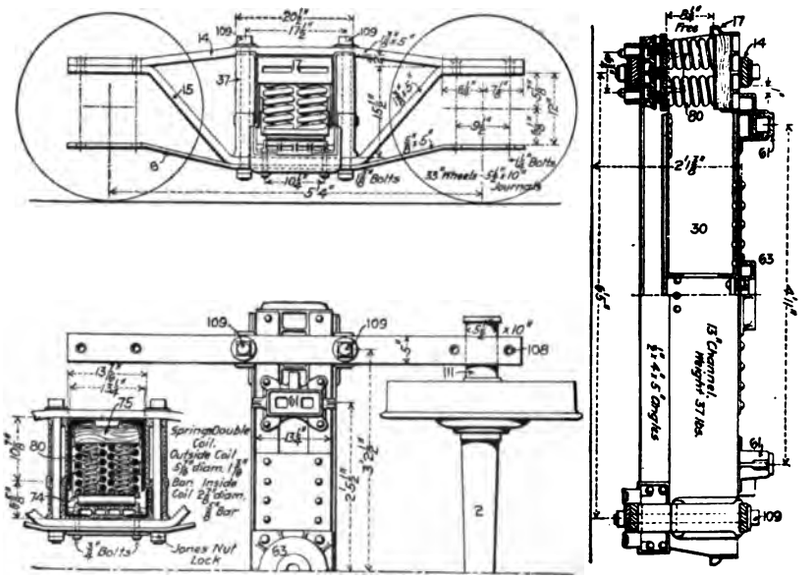


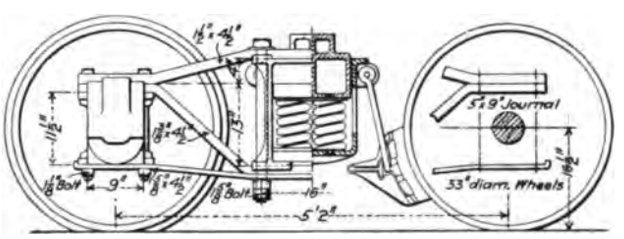
FIG. 3734. PLATE SIDE FRAME PASSENGER TRUCK. BARNEY & SMITH CAR CO., MAKERS.

NUMBERS REFER TO LIST OF NAMES WITH FIGS. 3715-3728.


Spring Double Coil, Outside Coil 5⅛" diam. 1⅛" Bar, Inside Coil 2⅝" diam. ⅝" Bar
¾" Bolts
Jones Nut Lock
15" Channel Weight 37 lbs.
5'-4" Journals

FIGS. 3735-3737. DIAMOND ARCH BAR TRUCK WITH BARBER ROLLER SIDE BEARINGS; 100,000 LBS. CAPACITY. STANDARD CAR TRUCK CO.

FIGS. 3738-3739. PLAN AND SIDE ELEVATION.



FIGS. 3741-3743. PLAN AND SIDE ELEVATION.

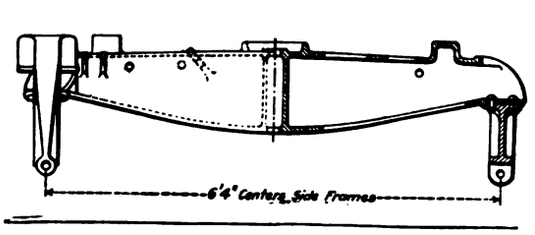


FIG. 3740. END ELEVATION.
AJAX CAST STEEL PEDESTAL TRUCK.
AMERICAN STEEL FOUNDRIES, MAKERS.

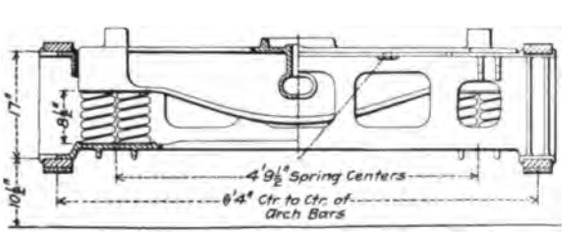
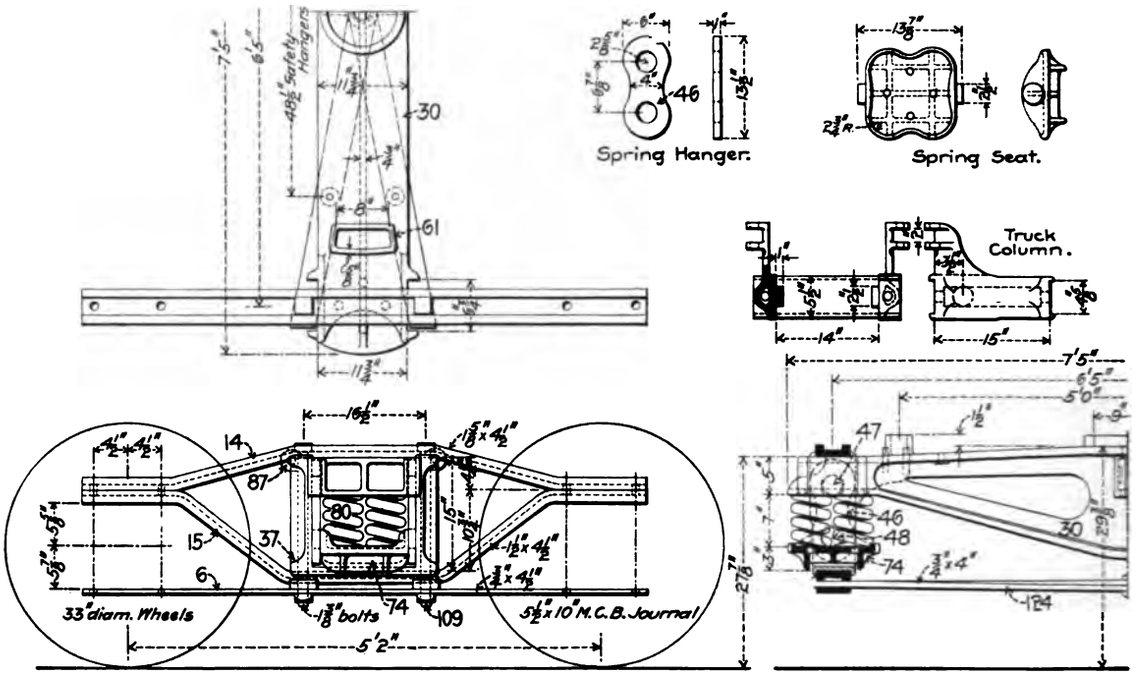
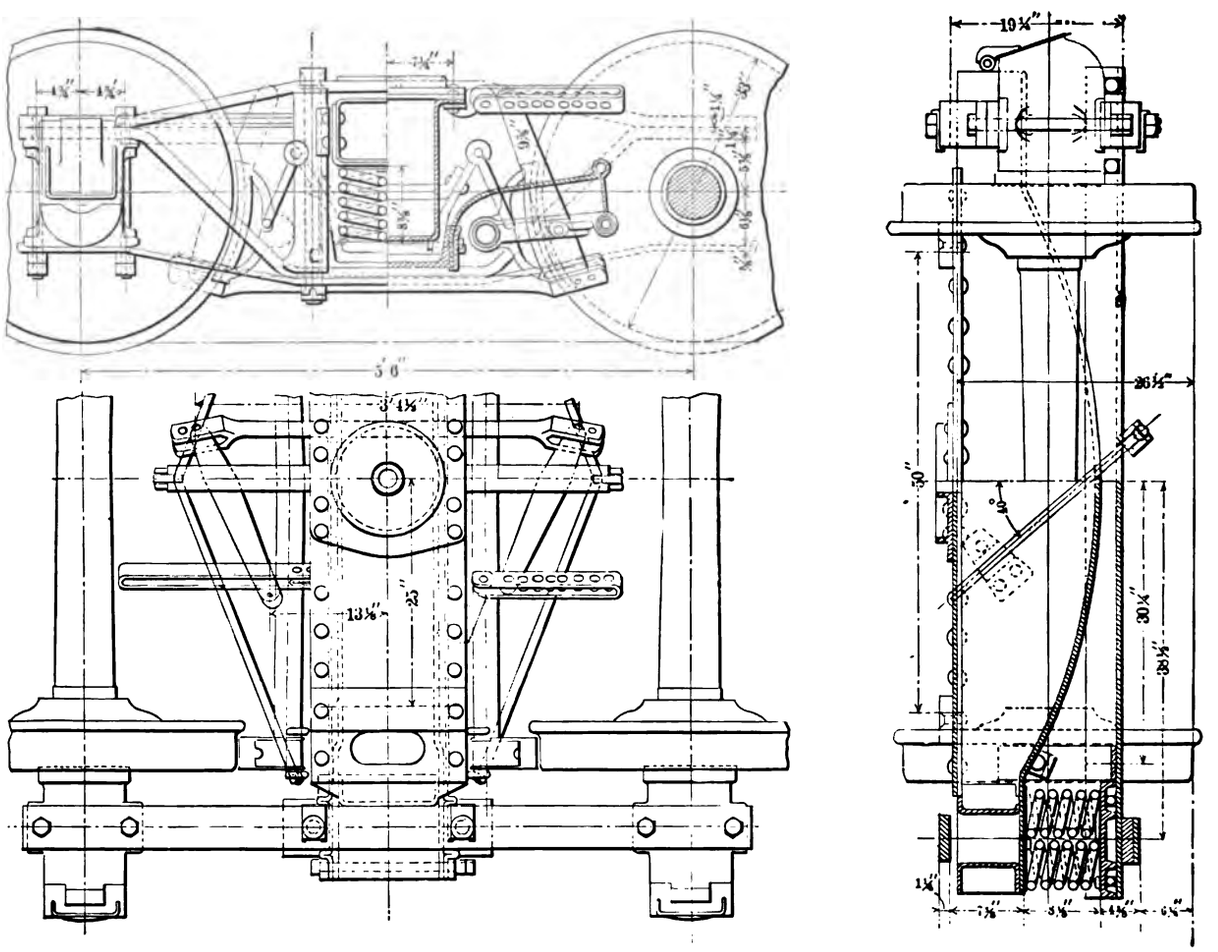


FIG. 3744. END ELEVATION.
CAST STEEL PLAYER TRUCK.
AMERICAN STEEL FOUNDRIES, MAKERS.

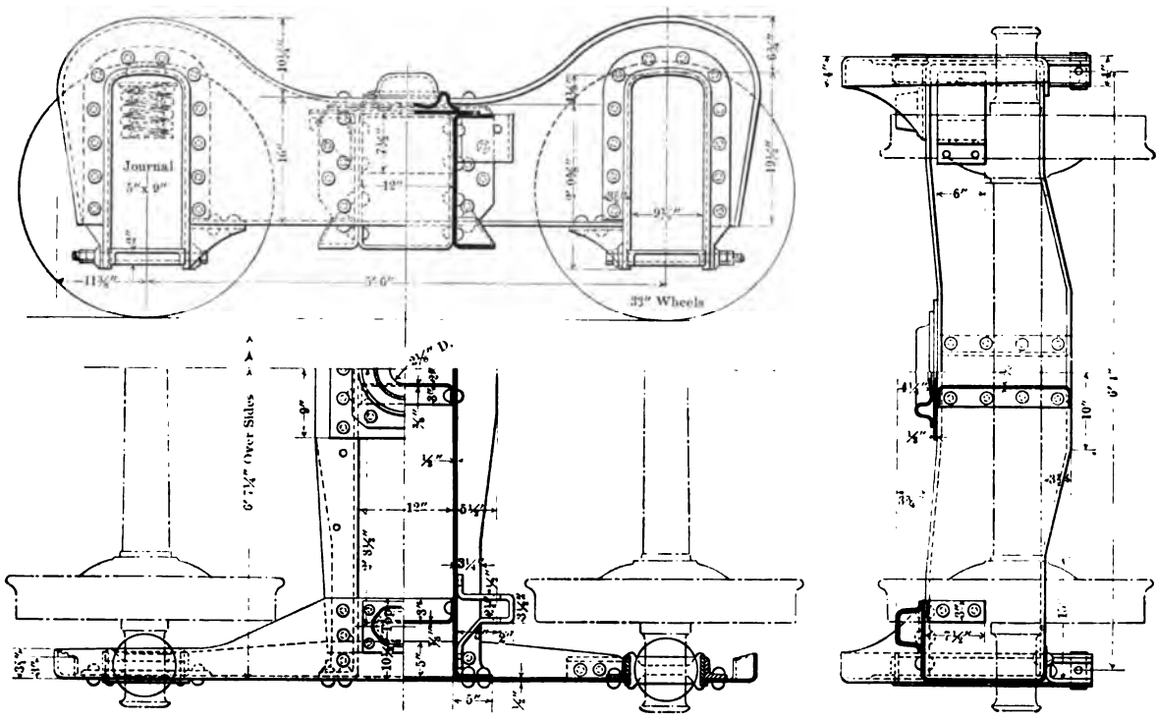
NUMBERS REFER TO LIST OF NAMES WITH FIGS. 3715-3728.



FIGS. 3745-3753. SWING MOTION DIAMOND ARCH BAR TRUCK; 100,000 LBS. CAPACITY.
COMMONWEALTH STEEL CO., MAKERS.

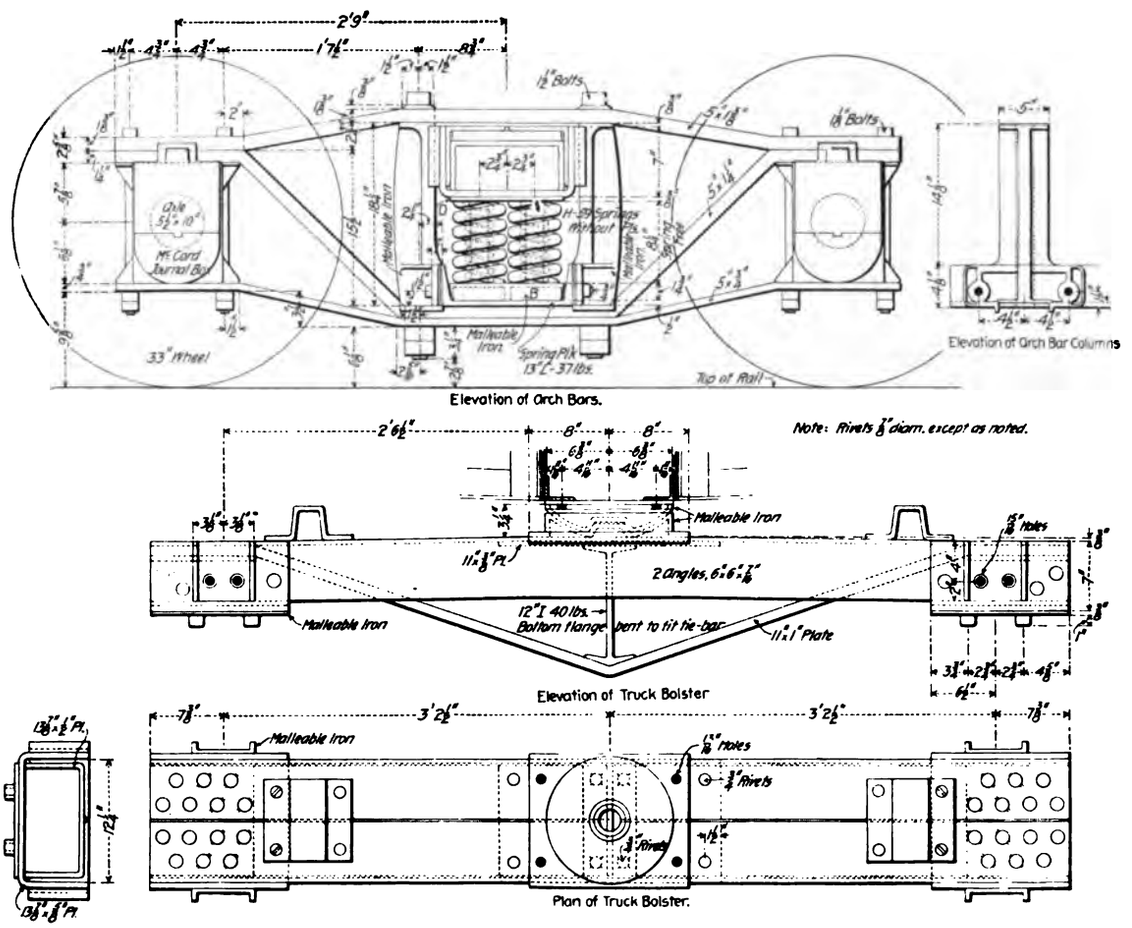


FIGS. 3754-3756. STANDARD 100,000-LB. TRUCK WITH PRESSED STEEL BOLSTER. P. R. R.

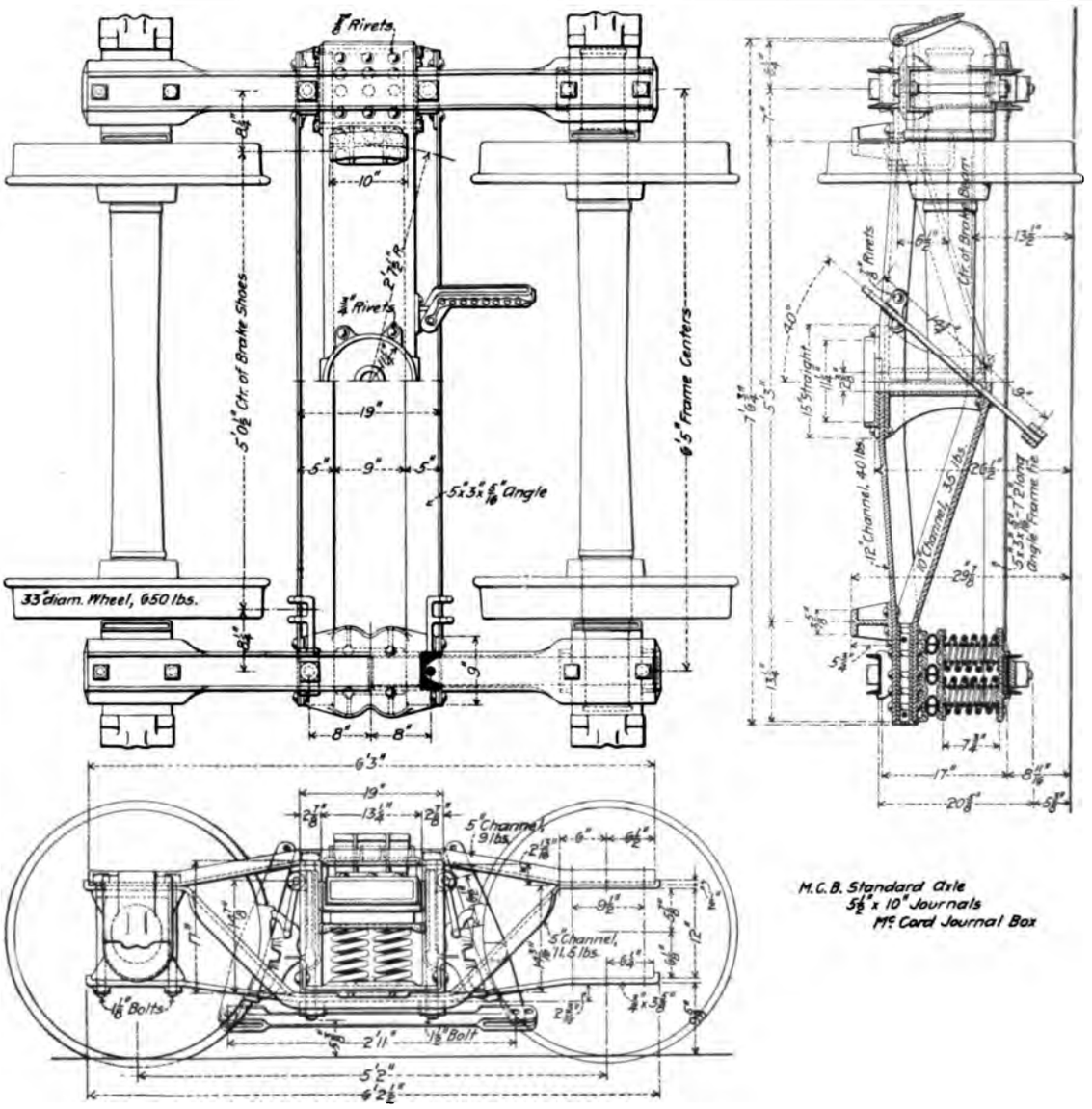


FIGS. 3757-3759. FOX PRESSED STEEL PEDESTAL TRUCK; 80,000 LBS. CAPACITY.

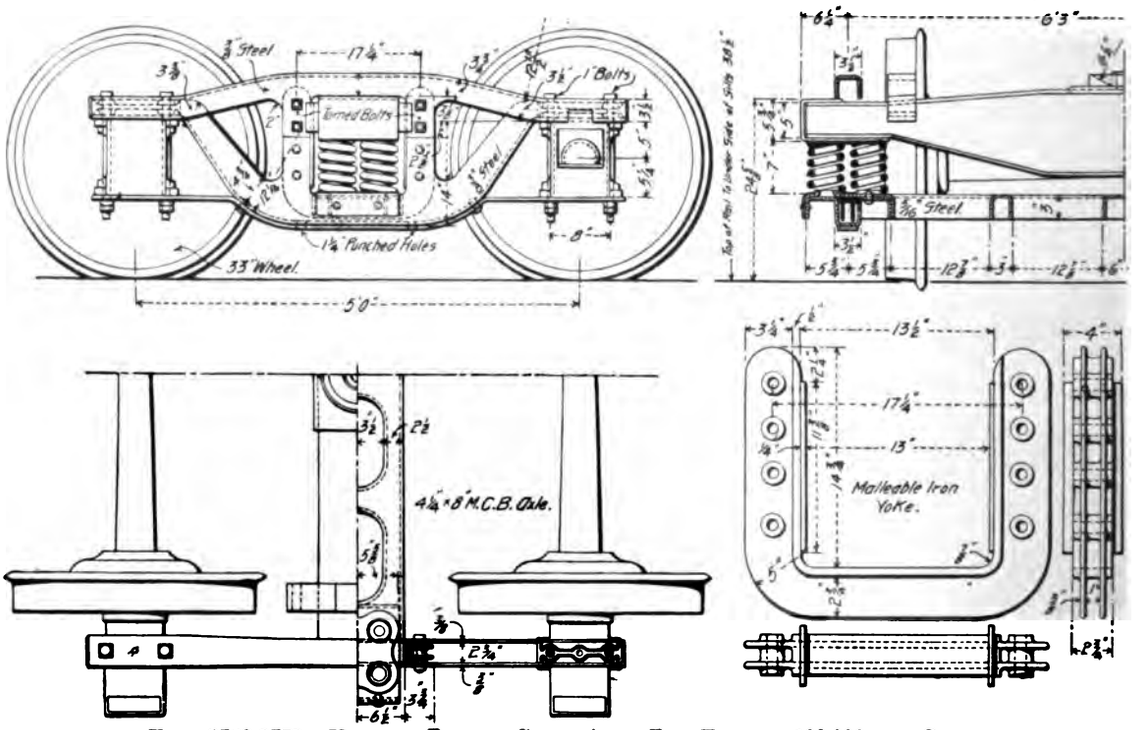
PRESSED STEEL CAR CO., MAKERS.


Elevation of Arch Bars.
Elevation of Arch Bar Columns
Note: Rivets ⅞" diam. except as noted.
Malleable Iron
2 Angles, 6" x 6" x ⅞"
12" I 40 lbs. Bottom flange bent to fit tie-bar
11" x 1" Plate
Elevation of Truck Bolster
Plan of Truck Bolster.

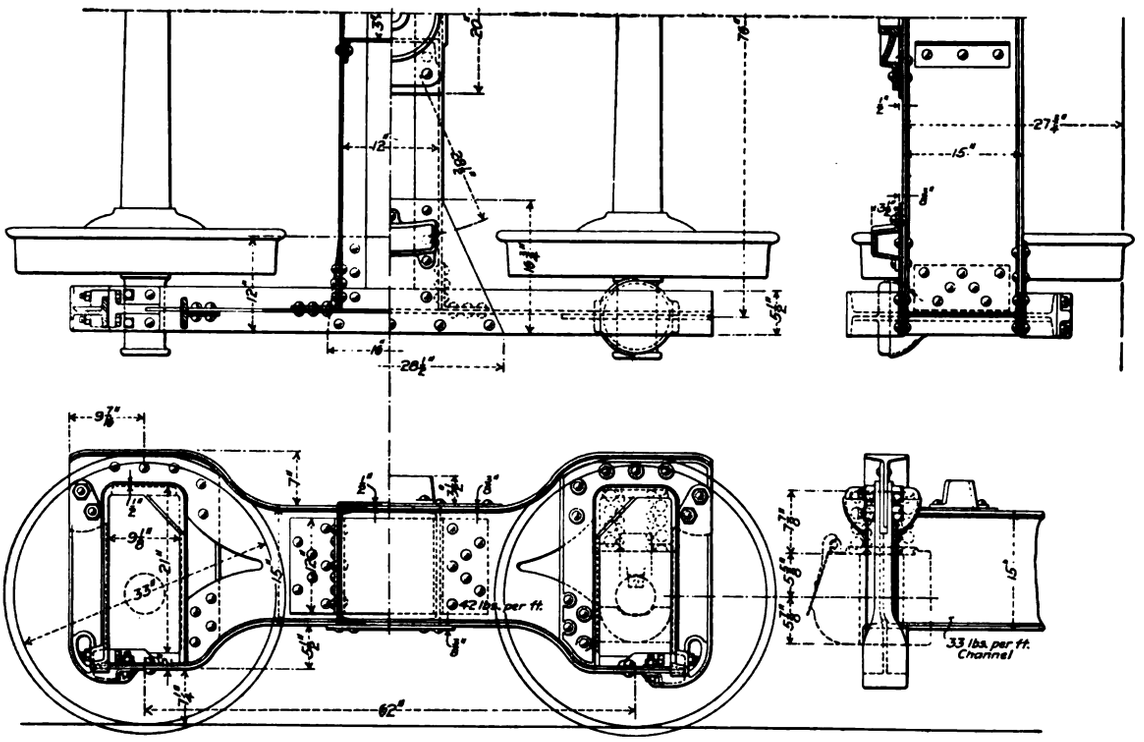
FIGS. 3760-3764. 100,000-LB. DIAMOND ARCH BAR TRUCK. CAMBRIA STEEL CO., MAKERS.



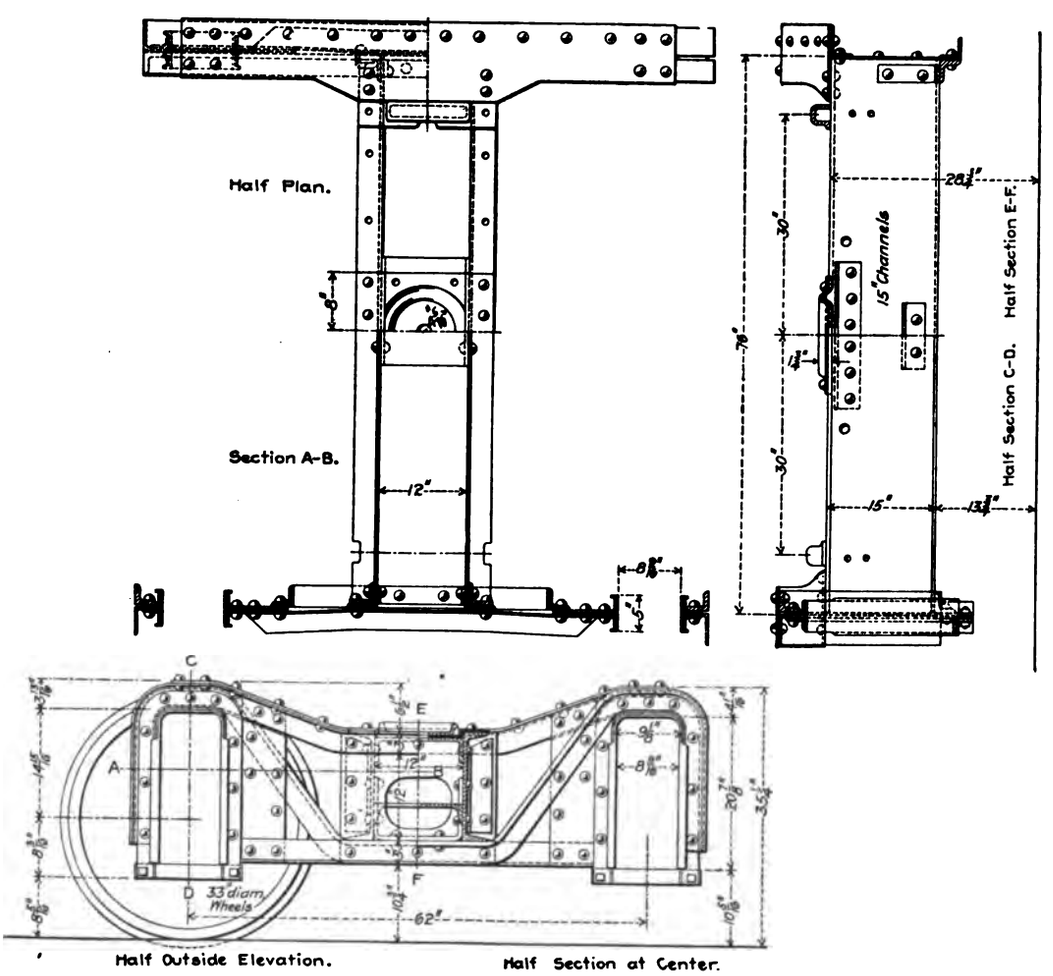
FIGS. 3765-3767. VANDERBILT CHANNEL ARCH BAR TRUCK WITH CRONE ROCKER SIDE BEARING. 100,000-LBS. CAPACITY. CAMBRIA STEEL CO., MAKERS.



FIGS. 3768-3773. HASKELL PRESSED STEEL ARCH BAR TRUCK. 100,000 LBS. CAPACITY. AMERICAN CAR & FOUNDRY CO., MAKERS.

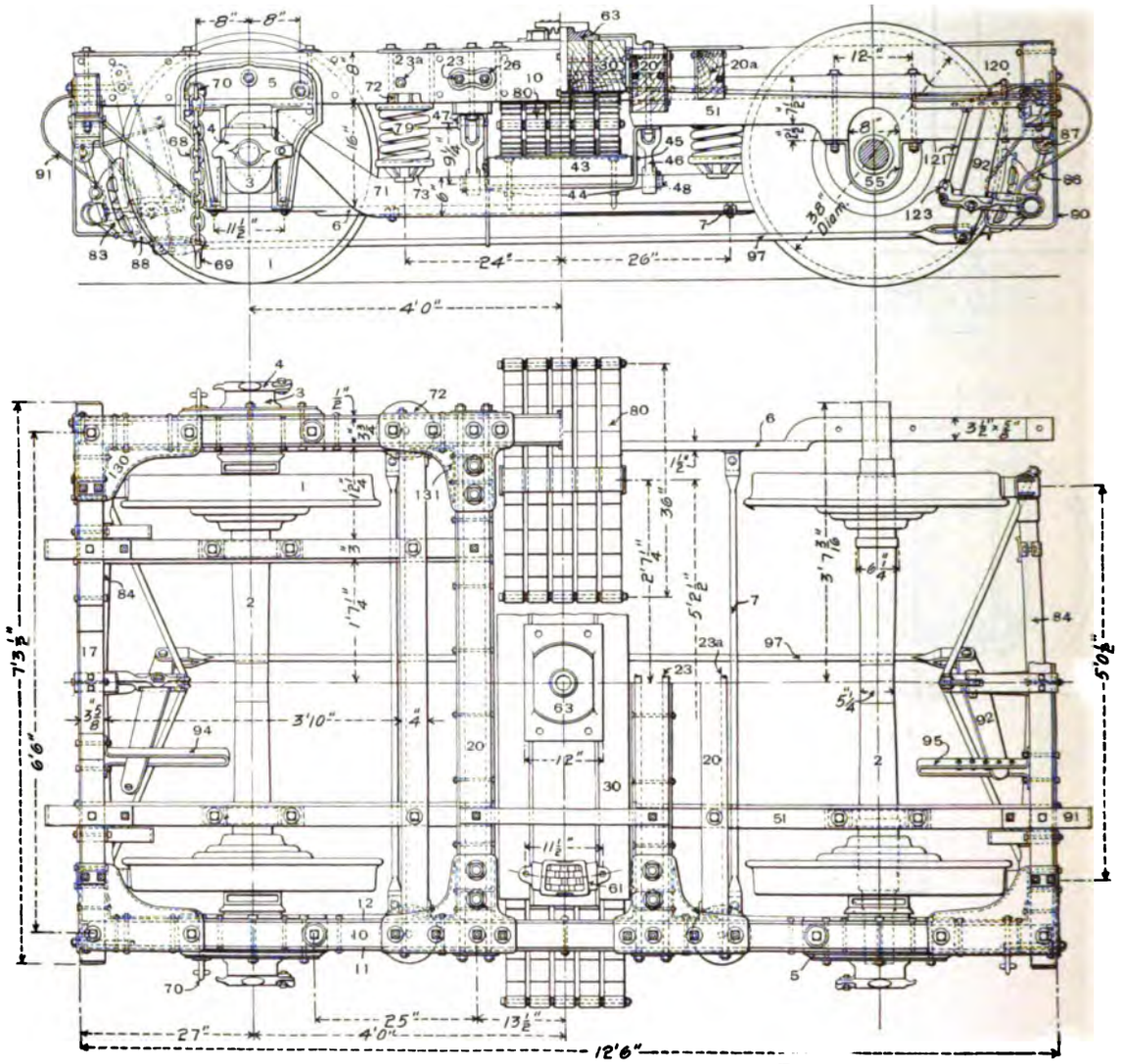


FIGS. 3774-3777. STERLINGWORTH PEDESTAL TRUCK. 80,000 LBS. CAPACITY.
STERLINGWORTH RY. SUPPLY CO., MAKERS.



FIGS. 3778-3780. STANDARD KINDL PEDESTAL TRUCK. CAPACITY, 80,000 LBS.
KINDL CAR TRUCK CO., MAKERS.

NUMBERS REFER TO LIST OF NAMES WITH FIGS. 3715-3728.



FIGS. 3781-3782. SIDE ELEVATION, SECTION AND PLAN.

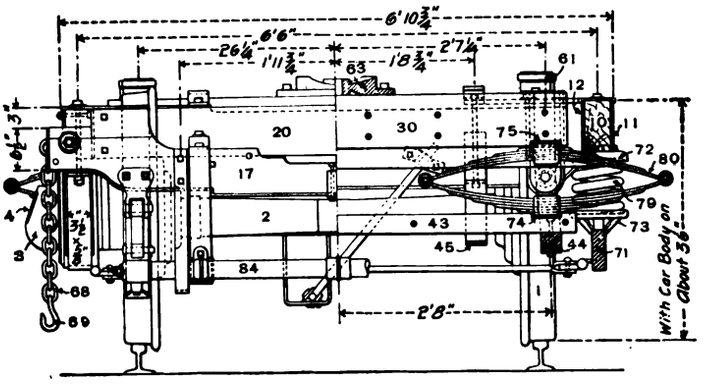
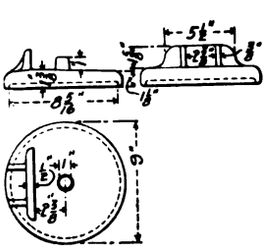
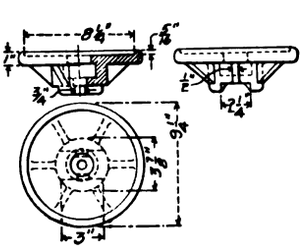


FIG. 3783. HALF END ELEVATION AND SECTION AT CENTER.
PULLMAN FOUR WHEEL TRUCK NO. 6E. ADOPTED WITH SLIGHT MODIFICATIONS BY NUMEROUS RAILROADS.



FIGS. 3784-3786.
EQUALIZER SPRING CAP.



FIGS. 3787-3789.
EQUALIZER SPRING SEAT.

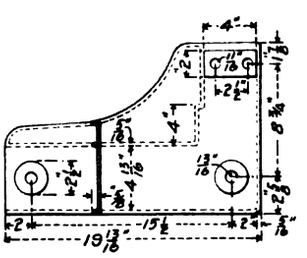
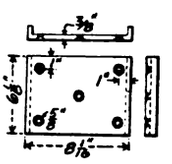
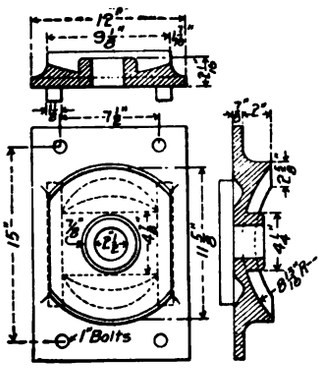


FIG. 3790.
END SILL CORNER PLATE.

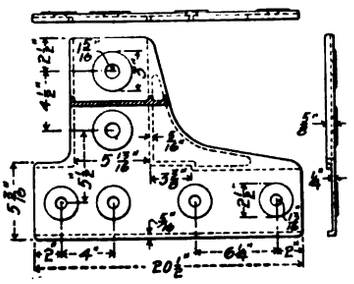


FIGS. 3791-3793.
FRICTION PLATE.

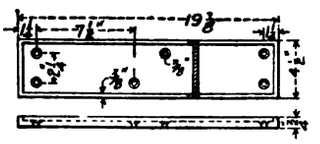
FIGS. 3794-3795.
TRANSOM TIE ROD WASHER.



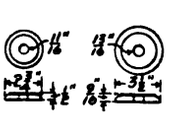
FIGS. 3796-3798. CENTER PLATE.



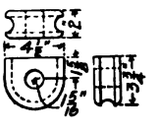
FIGS. 3799-3801. TRANSOM CORNER PLATE.



FIGS. 3802-3803. BOLSTER SPRING SEAT.

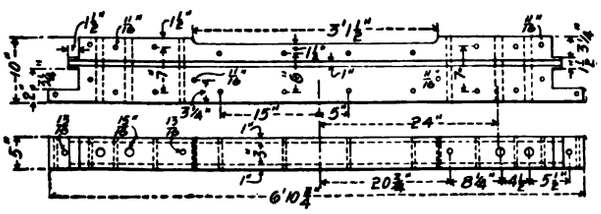


FIGS. 3804-3805. 5/8 IN. AND 3/4 IN. WASHERS.

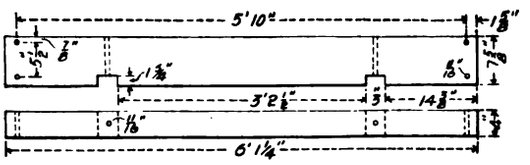


FIGS. 3806-3808. U BOLT CASTING.

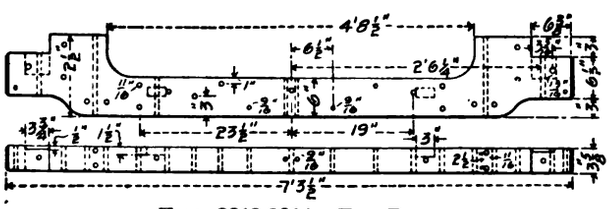
CAST AND MALLEABLE IRON DETAILS.



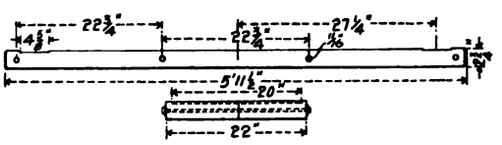
FIGS. 3809-3810. TRANSOM.



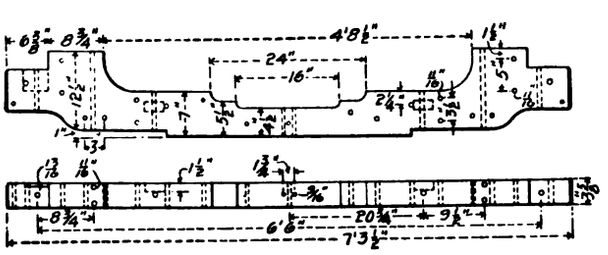
FIGS. 3811-3812. EXTRA TRANSOM.



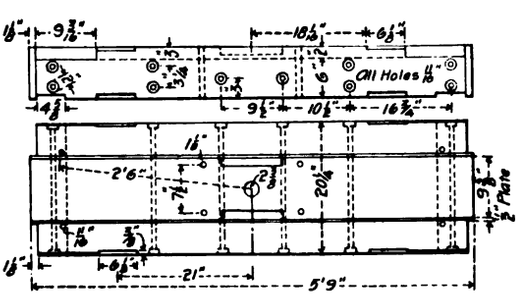
FIGS. 3813-3814. END PIECE.



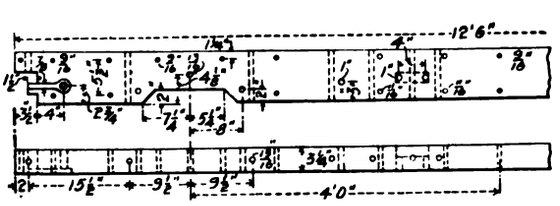
FIGS. 3815-3816. SPRING PLANK.



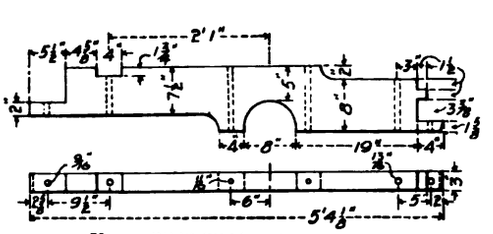
FIGS. 3817-3818. END PIECE.



FIGS. 3819-3820. BOLSTER.

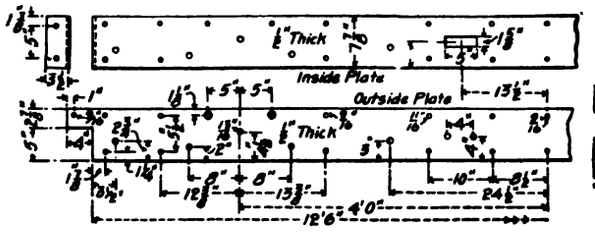


FIGS. 3821-3822. WHEEL PIECE.



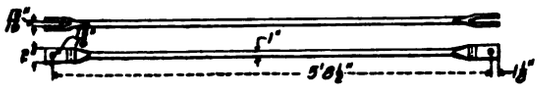
FIGS. 3823-3824. AXLE GUARD.

WOOD DETAILS.

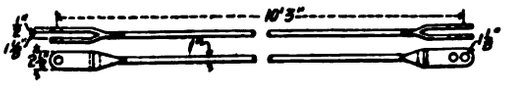


FIGS. 3825-3827. WHEEL PIECE PLATES.

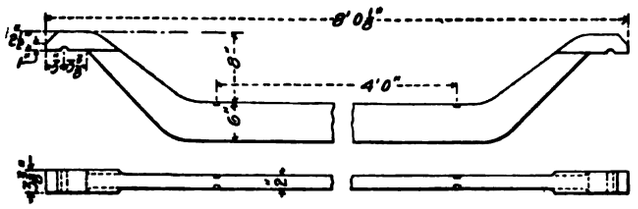
FIGS. 3828-3830. END PIECE BOTTOM PLATES.



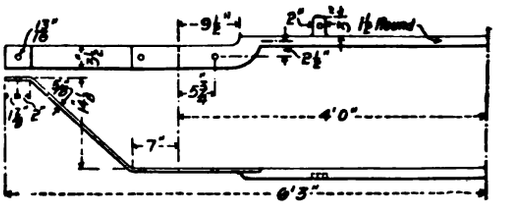
FIGS. 3831-3832. PEDESTAL STAY ROD.



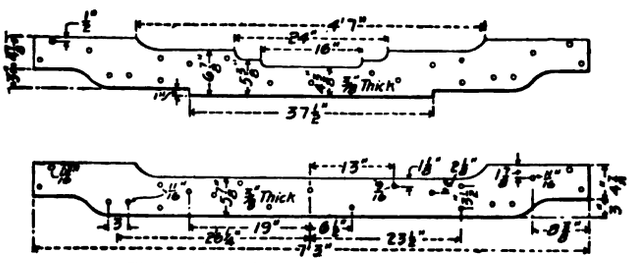
FIGS. 3833-3834. BRAKE RODS.



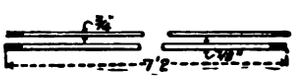
FIGS. 3835-3836. EQUALIZER.



FIGS. 3837-3838. PEDESTAL STRAP.



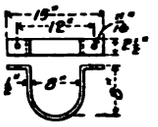
FIGS. 3839-3840. END PIECE PLATES.



FIGS. 3841-3842. TRANSOM TIE RODS.

FIGS. 3843-3844. EYE BOLT.

FIGS. 3845-3848. BRAKE LEVERS.



FIGS. 3849-3850. AXLE GUARD.

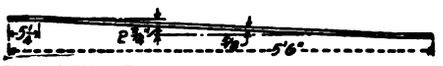
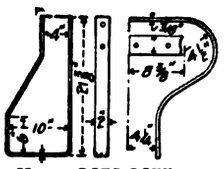
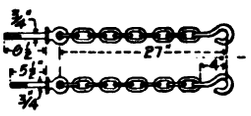


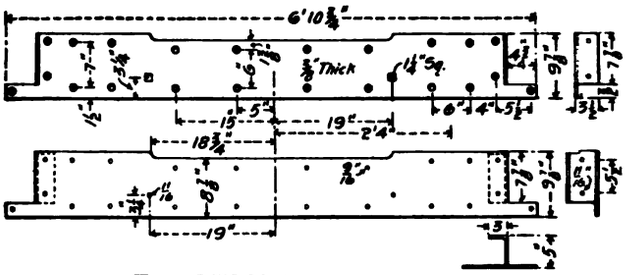
FIG. 3851. TRANSOM END PIECE TIE ROD.



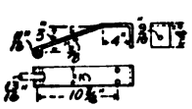
FIGS. 3852-3855. RELEASE SPRINGS.



FIGS. 3856-3857. CHECK CHAINS.



FIGS. 3858-3861. TRANSOM PLATES.



FIGS. 3862-3864. BALANCE SPRING.

FIG. 3865. SAFETY GUARD.

FIG. 3866. BOLSTER HANGER PIN.

FIG. 3867. U BOLT.

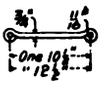
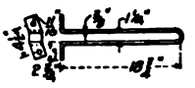
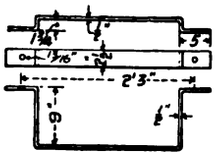


FIG. 3868. BRAKE HANGER.

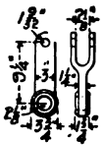


FIGS. 3869-3869A. LIVE LEVER GUIDE.

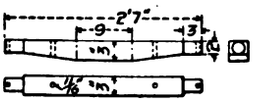
FIGS. 3870-3872. BRAKE HANGER CARRIER.



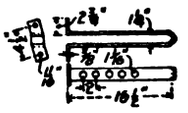
FIGS. 3873-3875. BOLSTER GUARD AND SAFETY HANGER.



FIGS. 3876-3877. BOLSTER HANGER.



FIGS. 3878-3880. BOLSTER HANGER AXLE.



FIGS. 3881-3883. BRAKE LEVER STOP.

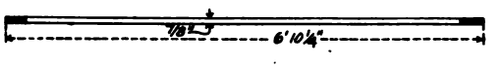
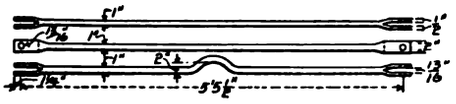


FIG. 3884. TRANSOM TIE ROD.

FIG. 3885
TRANSOM AND END PIECE TIE ROD.

FIGS. 3886-3887.
EYE BOLT.

FIG. 3888.
SAFETY GUARD.



FIGS. 3889-3891.
PEDESTAL STRAP STAY RODS.

FIGS. 3892-3895.
AXLE GUARDS.

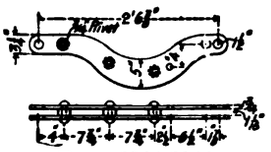
FIGS. 3896-3897.
U BOLT.

WROUGHT IRON DETAILS.

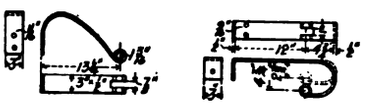
FIGS. 3898-3901.
BRAKE LEVERS.

FIGS. 3902-3907.
BRAKE BEAM HANGERS.

FIGS. 3908-3909.
FULCRUM HANGER CARRIER BEAM.



FIGS. 3910-3911.
LEVER FULCRUM.

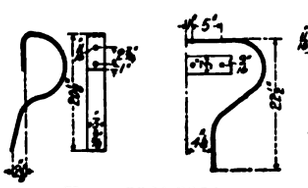


FIGS. 3912-3917.
BALANCE SPRINGS.

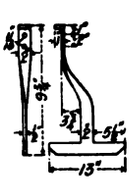
FIG. 3918.
BRAKE BEAM
HANGER PIN.

FIG. 3919.
BRAKE
LEVER PIN.

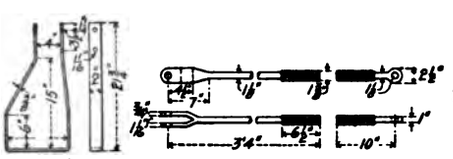
FIG. 3920.
BRAKE CONNECTION
PIN.



FIGS. 3921-3924.
RELEASE SPRINGS.



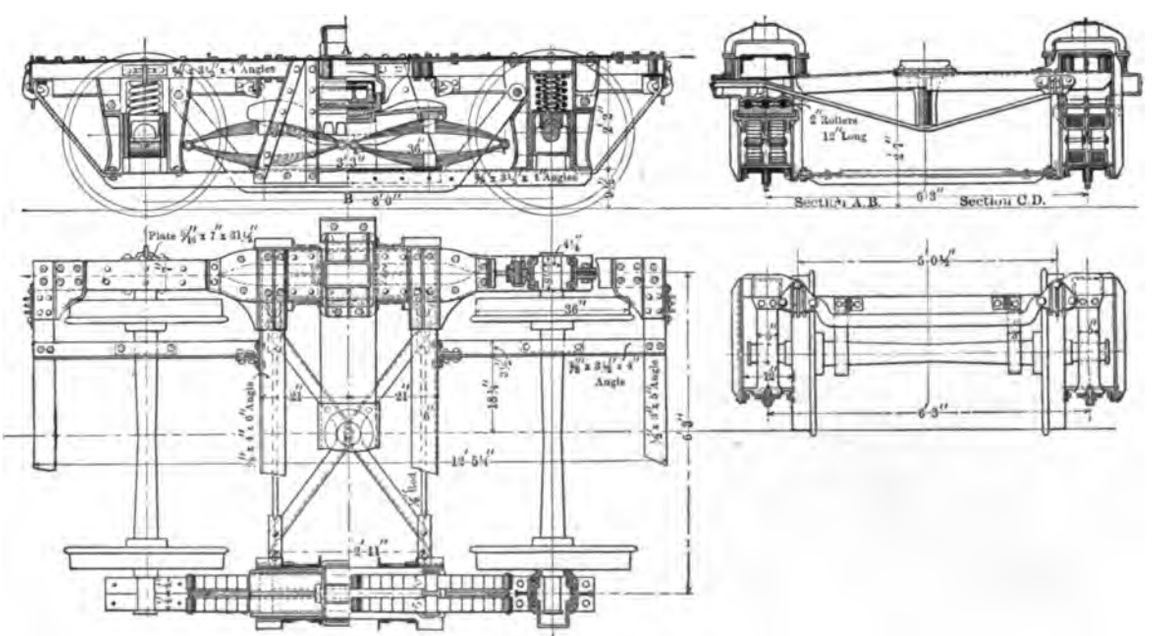
FIGS. 3925-3928.
BRAKE BEAM SAFETY GUARDS.



FIGS. 3929-3930.
CONNECTION RODS.

FIGS. 3931-3935.
BRAKE HANGER CARRIERS.

BRAKE DETAILS.



FIGS. 3936-3939. FOUR WHEEL PASSENGER TRUCK.
STANDARD CAR TRUCK CO.

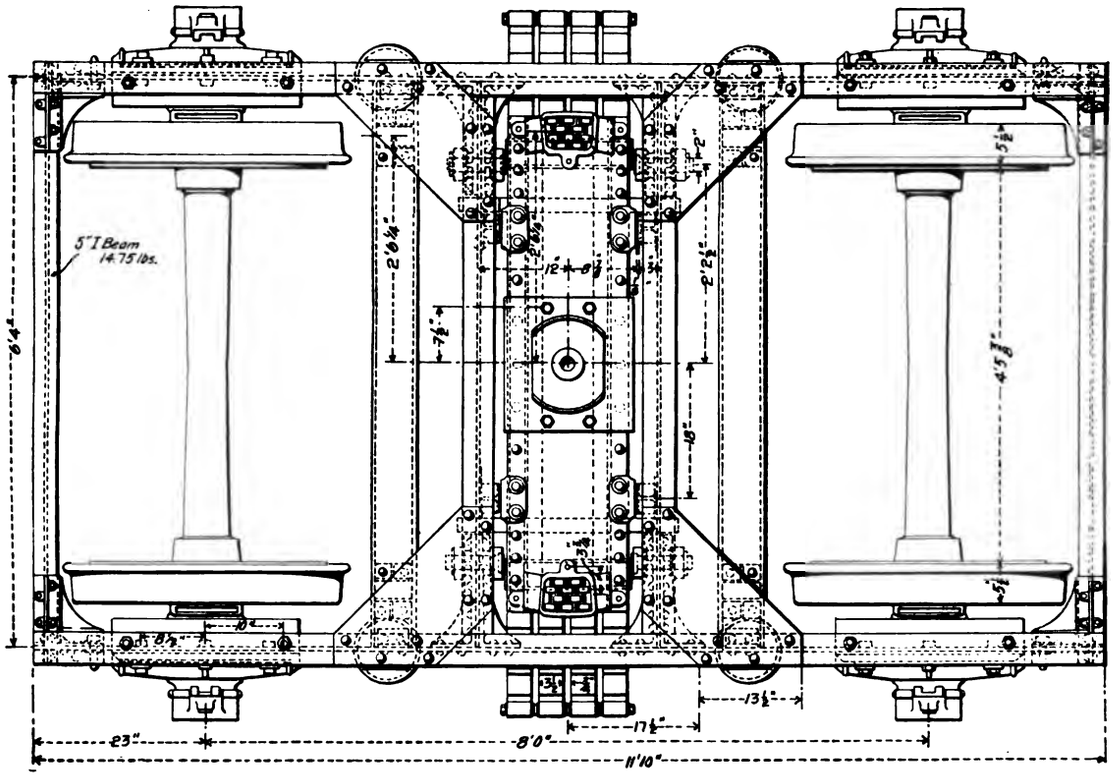


FIG. 3940. PLAN.

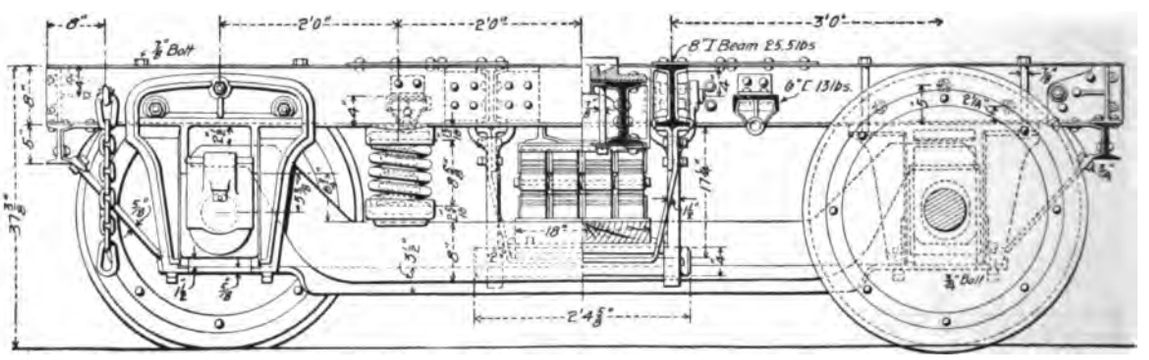


FIG. 3941. SIDE ELEVATION AND SECTION.

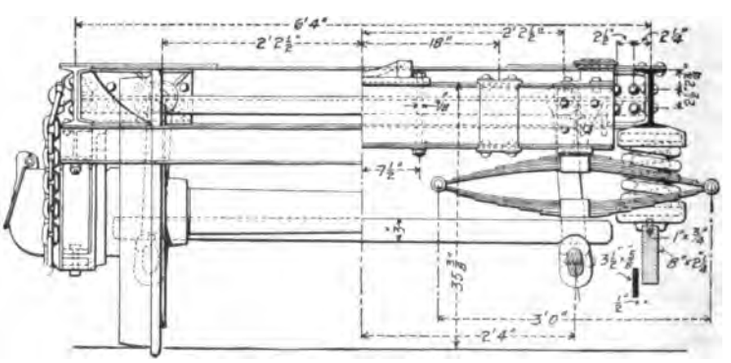


FIG. 3942. END ELEVATION AND SECTION.
ALL-METAL FOUR-WHEEL PASSENGER TRUCK. L. S. & M. S.

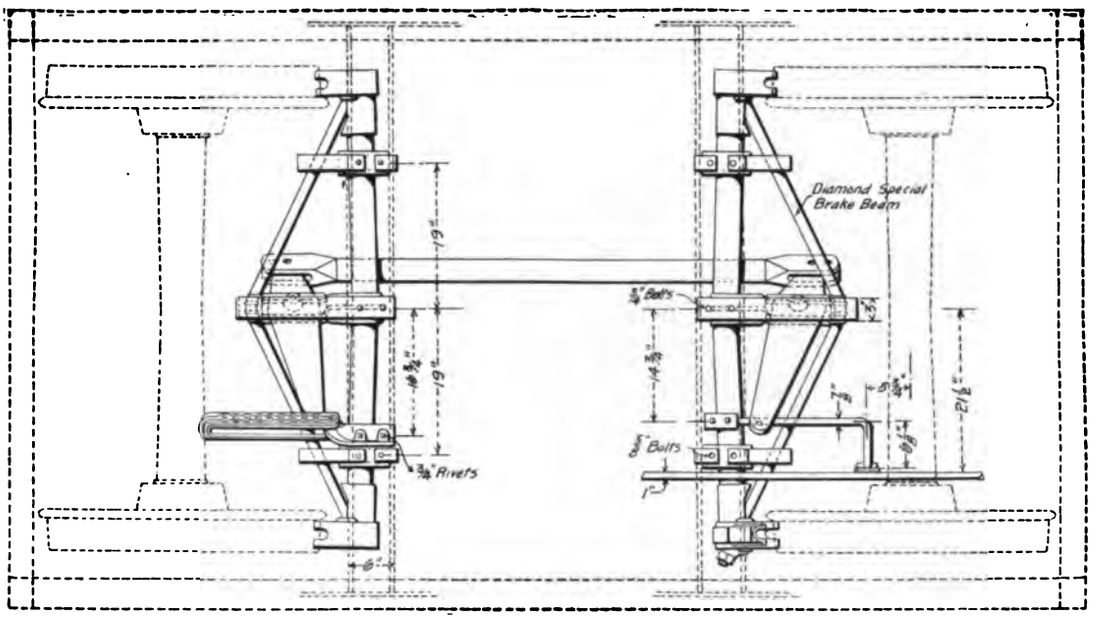


FIG. 3943. PLAN.

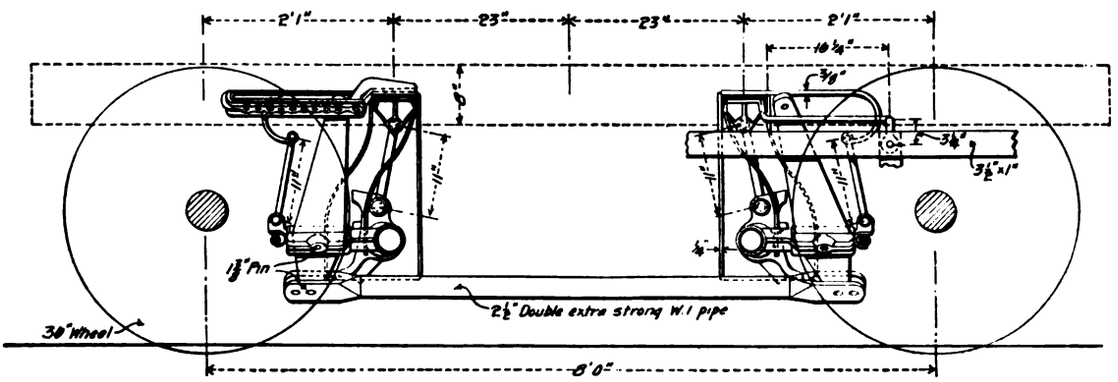


FIG. 3944. SIDE ELEVATION.

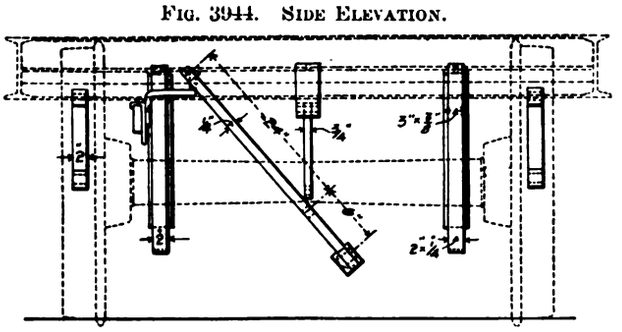


FIG. 3945. END ELEVATION.
DETAILS OF BRAKE GEAR, FOUR-WHEELED PASSENGER TRUCK. L. S. & M. S.

FIG. 3946. FOUR-WHEEL PASSENGER TRUCK, WOOD FRAME.
HARLAN & HOLLINGSWORTH, MAKERS.

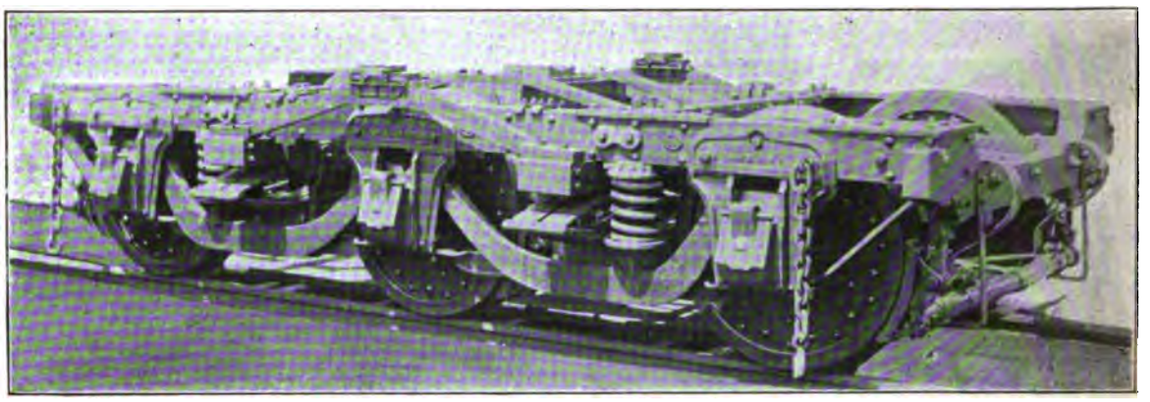
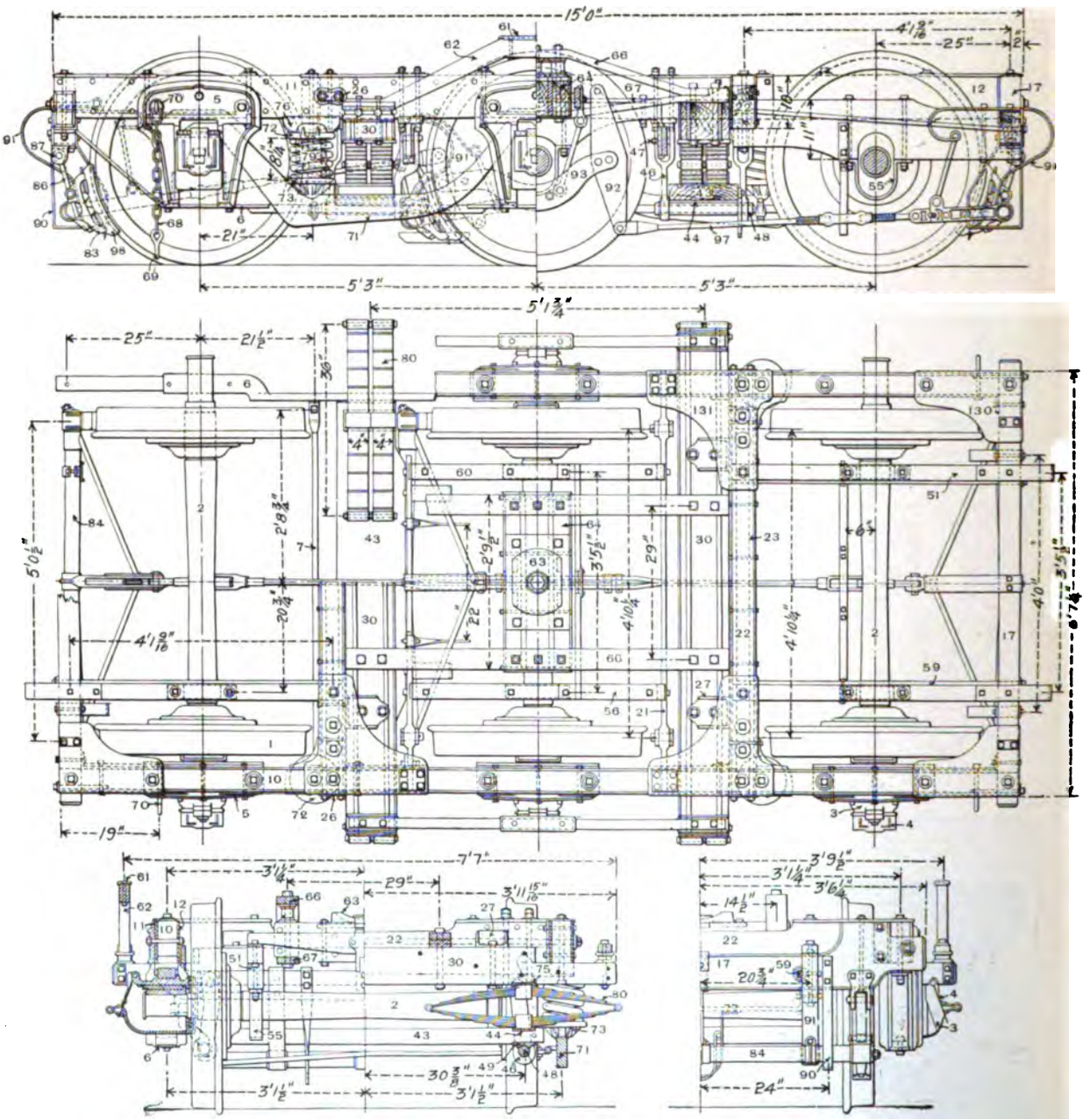
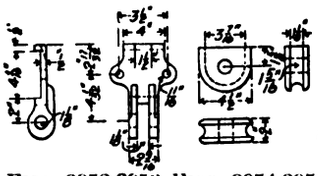


Fig. 3947. Six-Wheel Truck. Harlan & Hollingsworth Co., Builders.

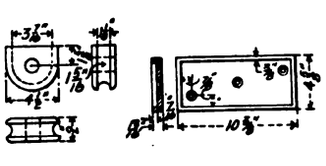


Figs. 3948-3951. Plan, Elevations and Sections of Six-Wheel Truck No. 5a. Pullman Co., Builders.

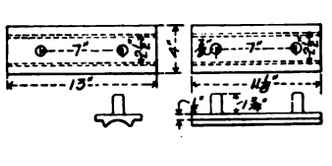
Standard for Parlor, Private, Dining and Sleeping Cars, and Adopted with Slight Modifications by Numerous Railroads.



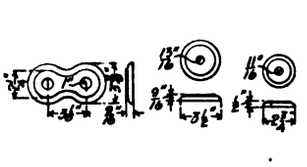
FIGS. 3952-3953. FULCRUM HANGER CARRIER.



FIGS. 3954-3956. BOLSTER HANGER BLOCK.



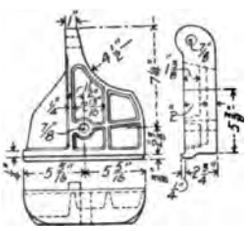
FIGS. 3957-3958. ELLIPTIC SPRING SEAT AND CAP.



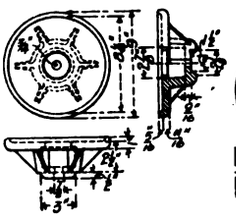
FIGS. 3959-3962. BOLSTER HANGER AXLE PLATES.

FIGS. 3963-3964. TRANSOM TRUSS ROD WASHER.

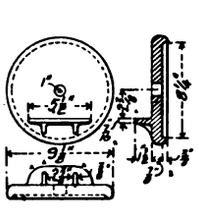
FIGS. 3965-3968. ¾ IN. AND ⅝ IN. WASHERS.



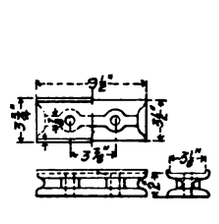
FIGS. 3969-3971. EQUALIZER SPRING BLOCK.



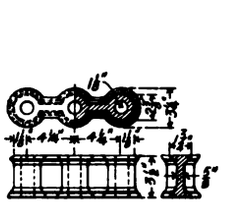
FIGS. 3972-3974. EQUALIZER SPRING SEAT.



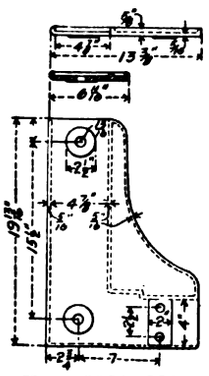
FIGS. 3975-3977. EQUALIZER SPRING CAP.



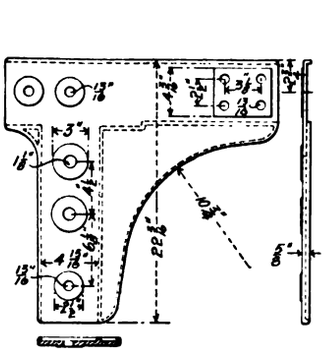
FIGS. 3978-3980. SIDE BEARING BLOCK.



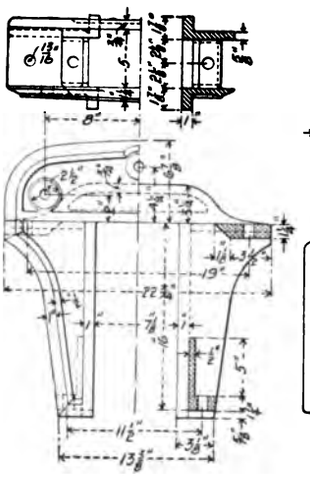
FIGS. 3981-3983. CENTER BLOCK COLUMN.



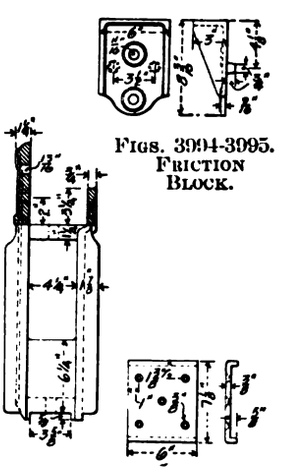
FIGS. 3984-3986. END SILL CORNER PLATE.



FIGS. 3987-3989. TRANSOM CORNER PLATE.



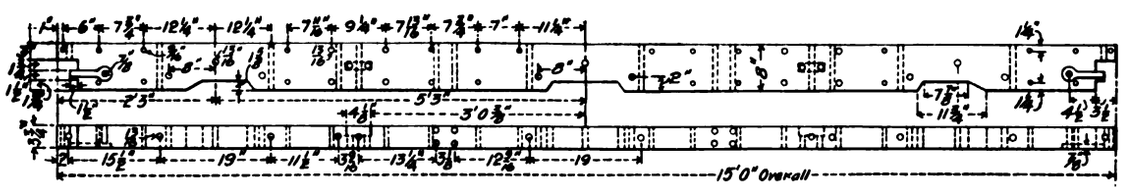
FIGS. 3990-3993. PEDESTAL.



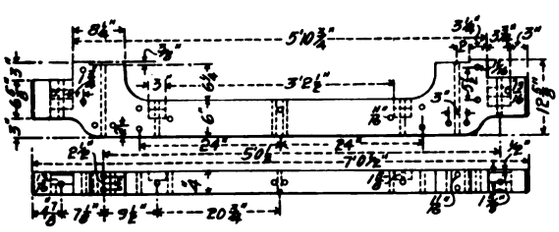
FIGS. 3994-3995. FRICTION BLOCK.

FIGS. 3996-3997 BOLSTER CHAFING PLATE.

CAST AND MALLEABLE IRON DETAILS.



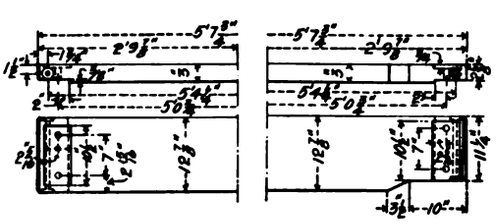
FIGS. 3998-3999. WHEEL PIECE.



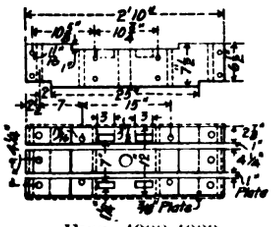
FIGS. 4000-4001. END PIECE.

FIGS. 4002-4003. TRANSOM.

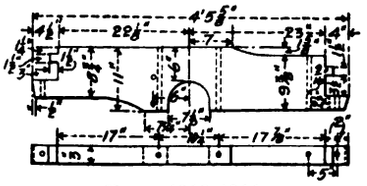
FIGS. 4004-4005. BOLSTER.



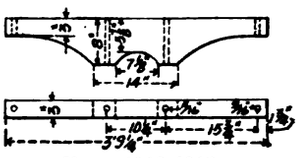
FIGS. 4006-4007. SPRING PLANKS.



FIGS. 4008-4009.
CENTER BLOCK.

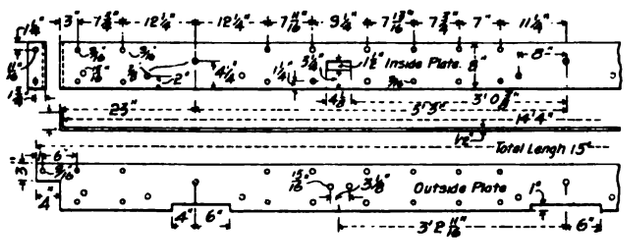


FIGS. 4010-4011.
END AXLE GUARD.

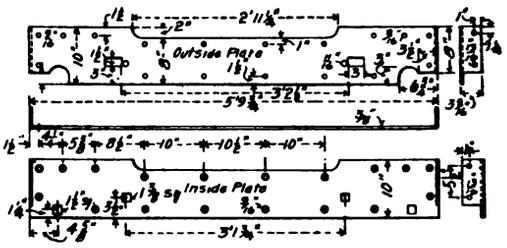


FIGS. 4012-4013.
CENTER AXLE GUARD.

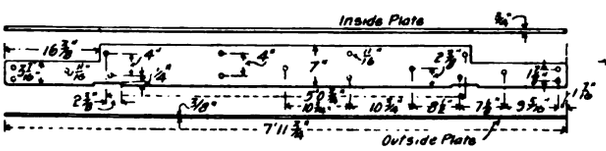
WOOD DETAILS.



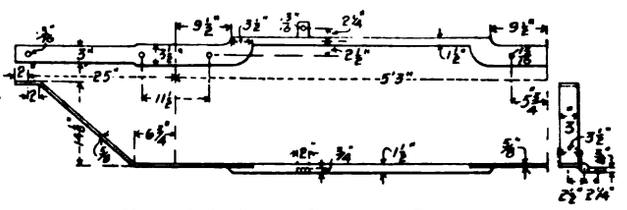
FIGS. 4014-4017. WHEEL PIECE PLATES.



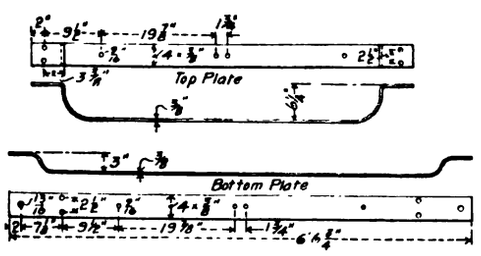
FIGS. 4018-4022. TRANSOM PLATES.



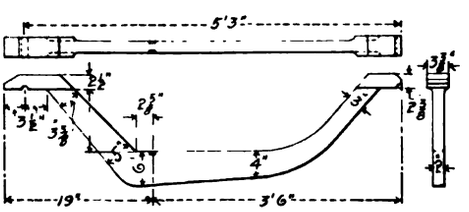
FIGS. 4023-4025. BOLSTER PLATES.



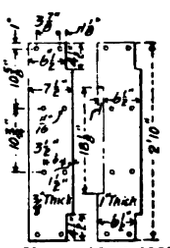
FIGS. 4026-4028. PEDESTAL STRAP.



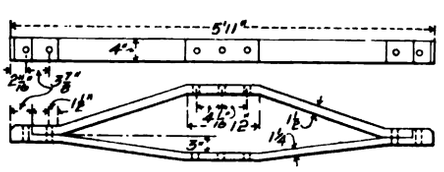
FIGS. 4029-4032. END PIECE PLATES.



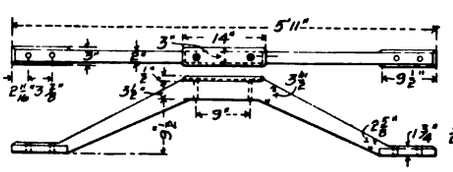
FIGS. 4033-4035. EQUALIZER.



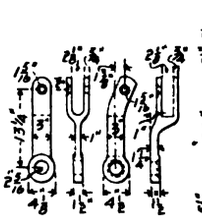
FIGS. 4036-4037.
CENTER BLOCK PLATES.



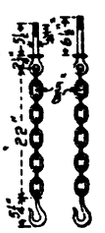
FIGS. 4038-4039.
CENTER BEARING TRUSS.



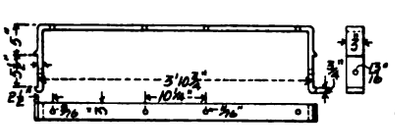
FIGS. 4040-4041.
SIDE BEARING SUPPORT.



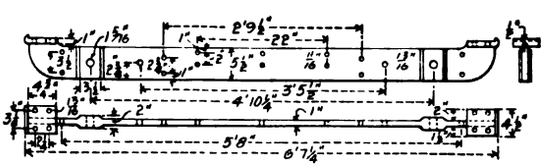
FIGS. 4042-4045.
BOLSTER HANGERS.



FIGS. 4046-4047.
SAFETY CHAINS.

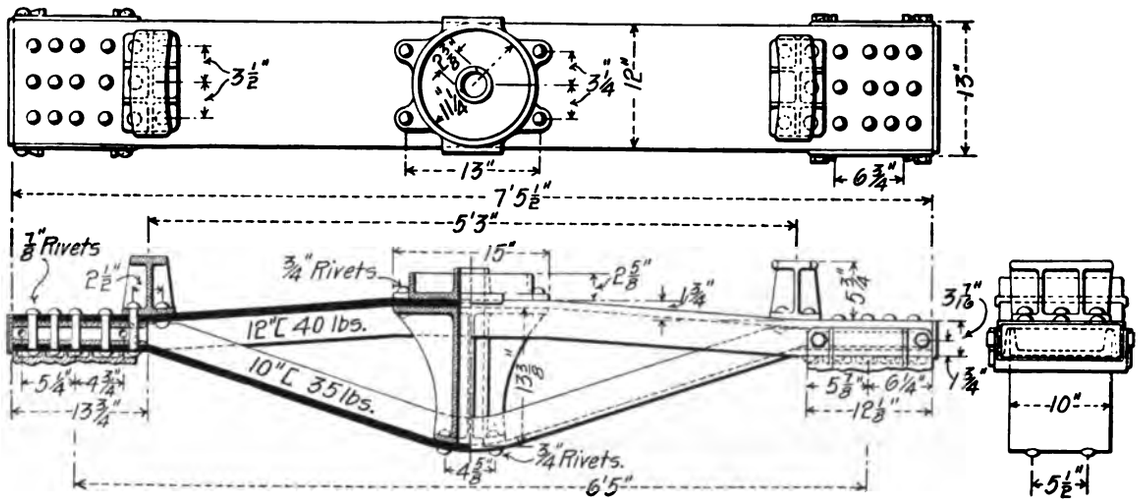


FIGS. 4048-4050. AXLE GUARD TRUSS.

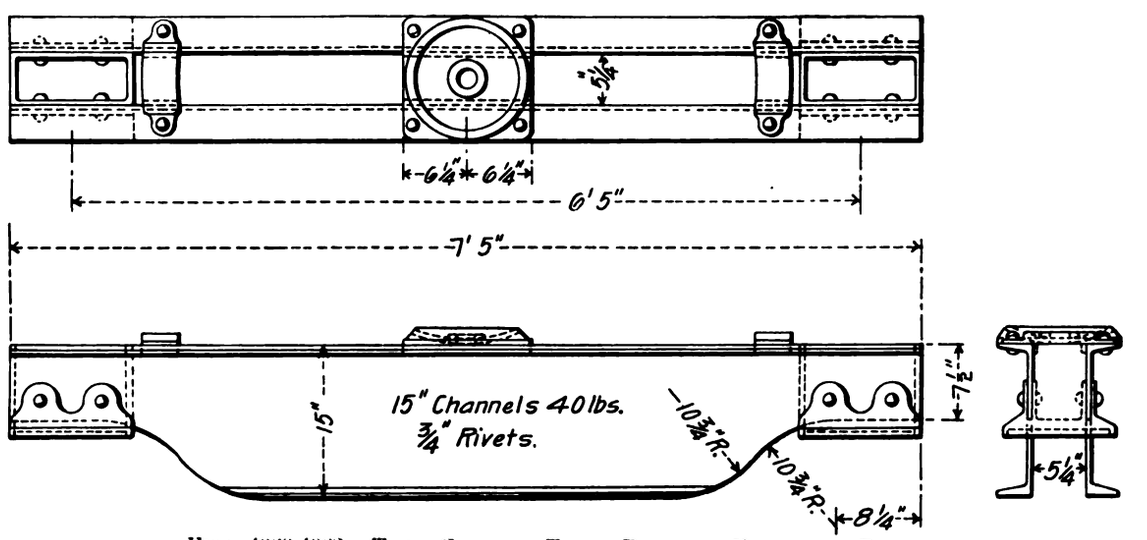


FIGS. 4051-4053. MIDDLE TRANSOM.

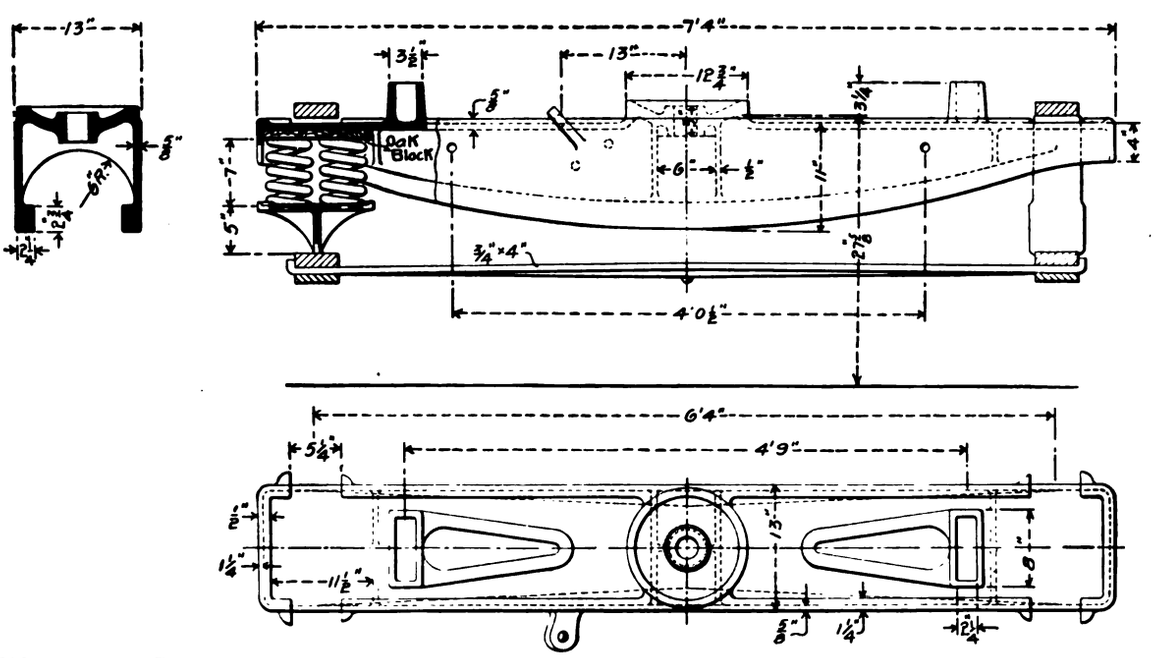
FIGS. 4054-4056.
BOLSTER HANGER
AXLES AND PIN.



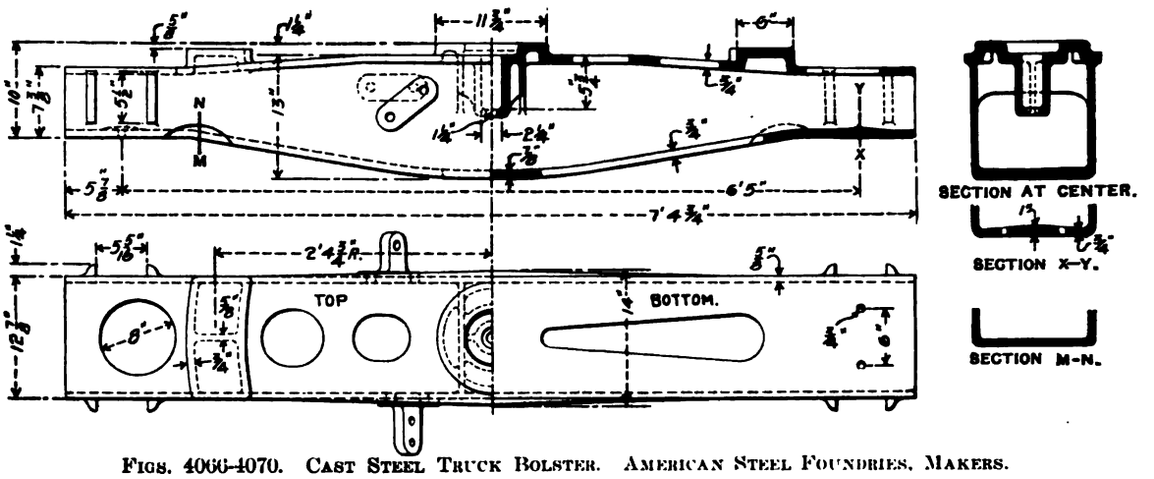
FIGS. 4057-4059. TRUSSED CHANNEL TRUCK BOLSTER. VANDERBILT PATENT.



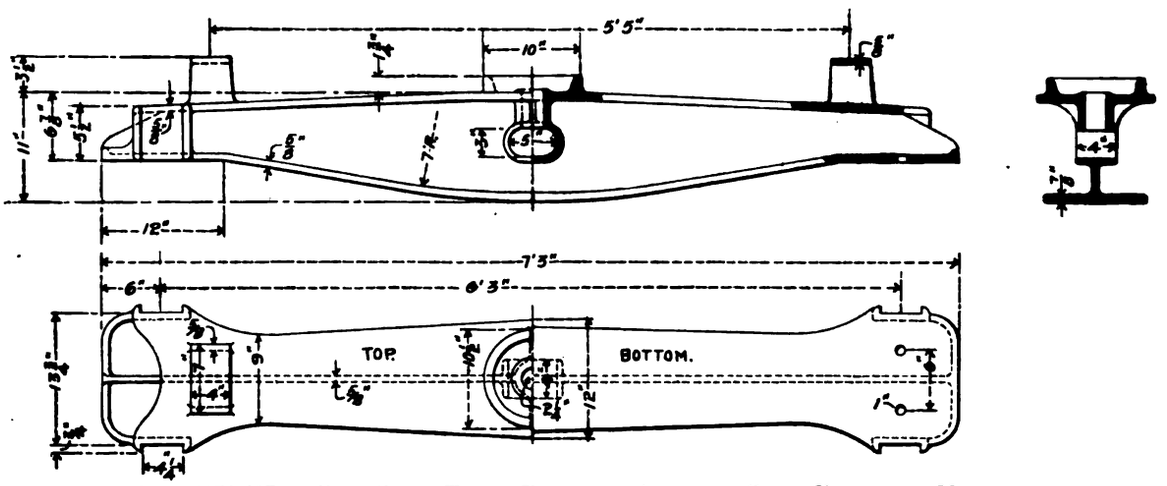
FIGS. 4060-4062. TWIN CHANNEL TRUCK BOLSTER. VANDERBILT PATENT.



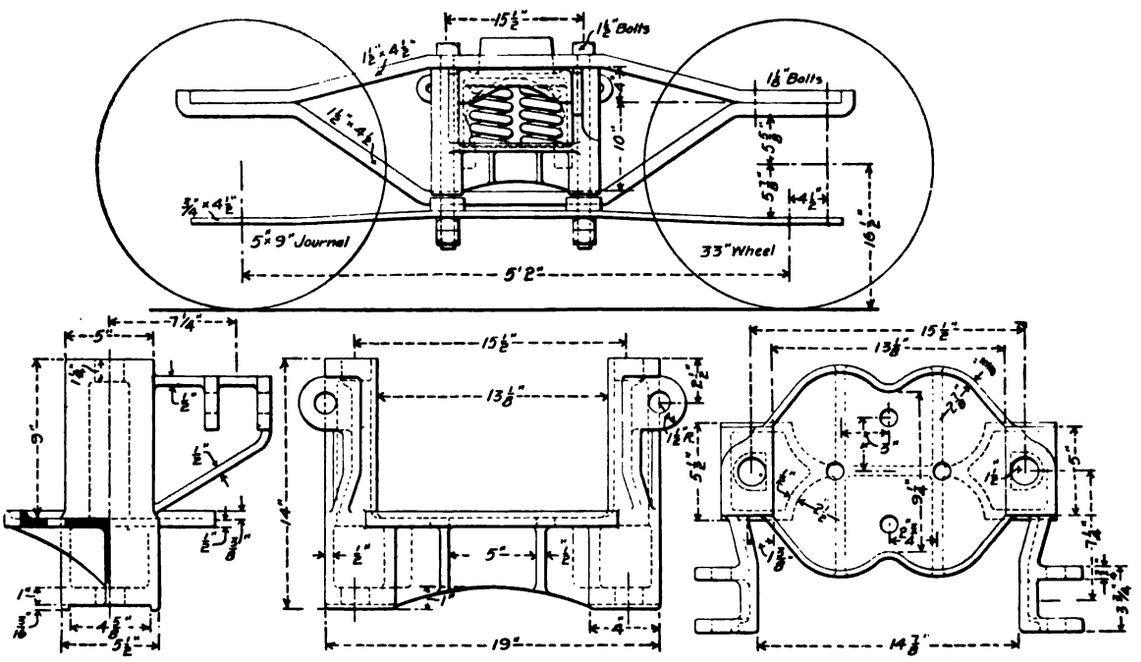
FIGS. 4063-4065. CAST STEEL TRUCK BOLSTER. AMERICAN STEEL FOUNDRIES, MAKERS.



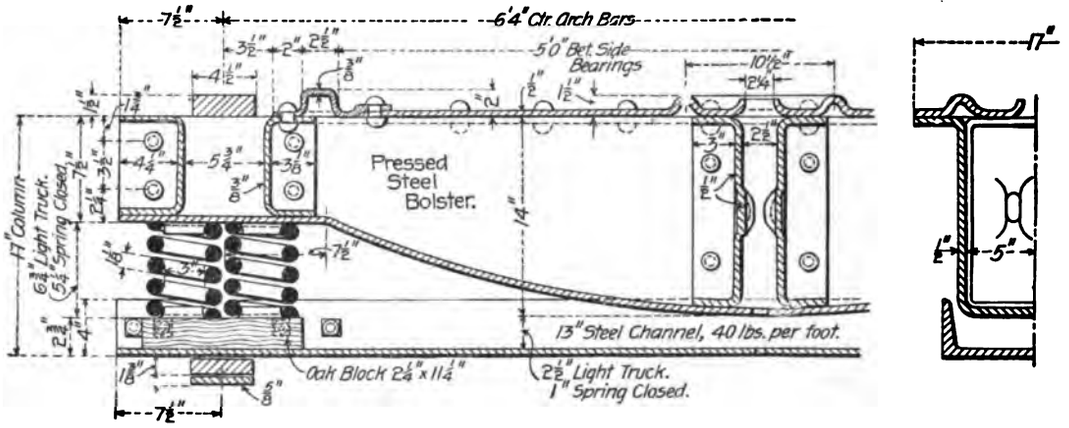
FIGS. 4066-4070. CAST STEEL TRUCK BOLSTER. AMERICAN STEEL FOUNDRIES, MAKERS.



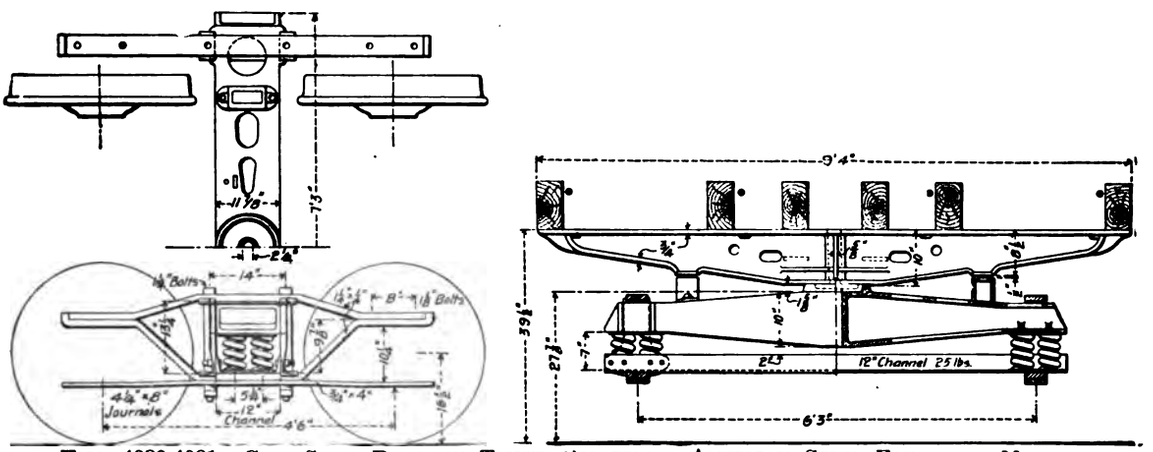
FIGS. 4071-4073. CAST STEEL TRUCK BOLSTER. AMERICAN STEEL FOUNDRIES, MAKERS.



FIGS. 4074-4077. STANDARD COLUMN, BRAKE HANGER AND SPRING SEAT, CAST STEEL. AMERICAN STEEL FOUNDRIES, MAKERS.


6'4" Ctr. Arch Bars
50" Bet. Side Bearings
Pressed Steel Bolster.
13" Steel Channel, 40 lbs. per foot.
Oak Block 2¼" x 11¼"
2½" Light Truck. 1" Spring Closed.
17" Column
6¾" Light Truck. 5½" Spring Closed.

FIGS. 4078-4079. PRESSED STEEL BOLSTER FOR 100,000-LB. TRUCKS. C., C., C. & ST. L.



FIGS. 4080-4081. CAST STEEL BODY AND TRUCK BOLSTERS. AMERICAN STEEL FOUNDRIES, MAKERS.

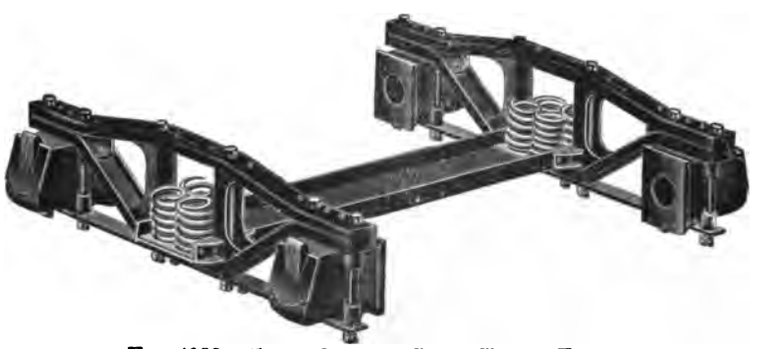


FIG. 4082. CLOUD PRESSED STEEL TRUCK FRAME.
KINDL CAR TRUCK CO., MAKERS.

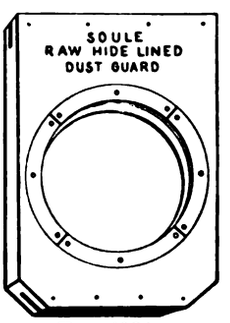


FIG. 4084.
SOULE RAWHIDE LINED DUST GUARD.
SOULE RAWHIDE LINED DUST GUARD CO., MAKERS.

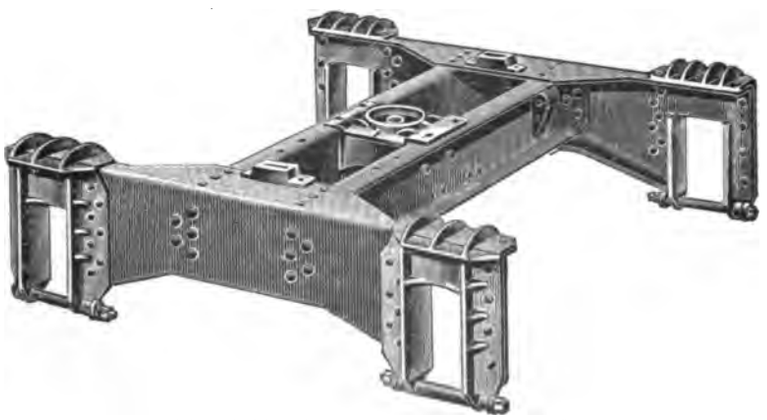
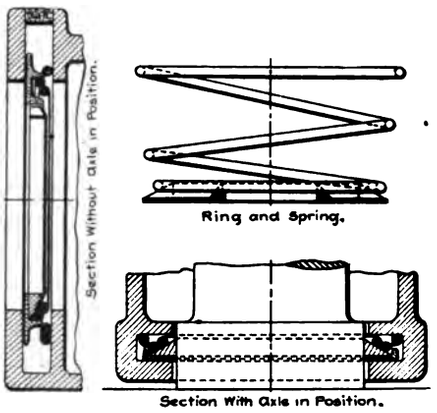


FIG. 4083. CLOUD PEDESTAL TRUCK FRAME.
KINDL CAR TRUCK CO., MAKERS.

FIG. 4085.
WAYCOTT DUST GUARD.
WAYCOTT SUPPLY CO., MAKERS.



FIGS. 4086-4088. SYMINGTON DUST GUARD.
T. H. SYMINGTON & CO., MAKERS.

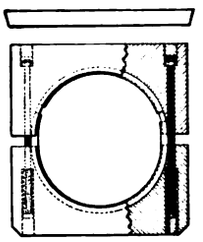


FIG. 4089. HARRISON DUST GUARD.
HARRISON DUST GUARD CO., MAKERS.

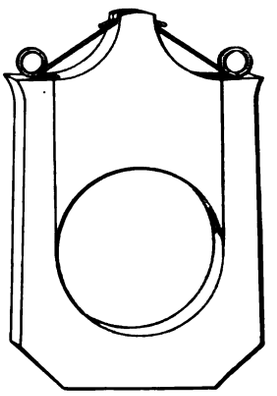
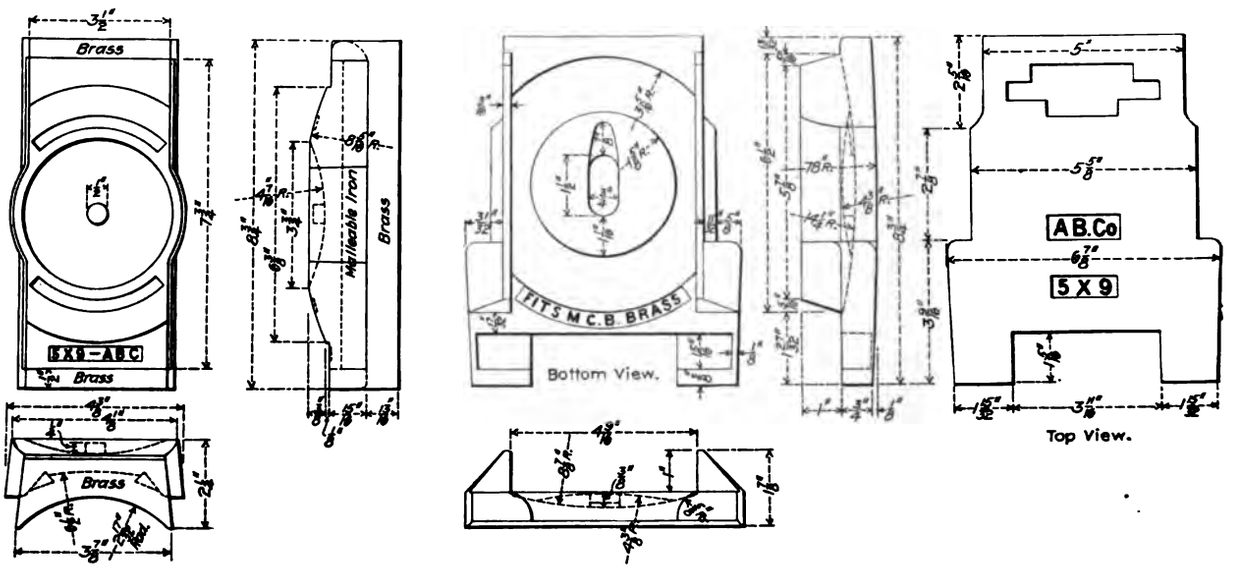
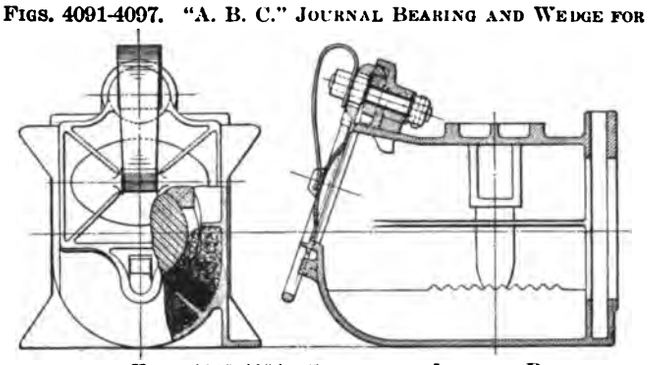


FIG. 4090. AMERICAN DUST GUARD. AMERICAN DUST GUARD CO., MAKERS.



FIGS. 4091-4097. "A. B. C." JOURNAL BEARING AND WEDGE FOR 5 IN. x 9 IN. JOURNAL. ATLANTIC BRASS CO., MAKERS.



FIGS. 4100-4101. SYMINGTON JOURNAL BOX.
T. H. SYMINGTON & CO., MAKERS.

FIG. 4098. "A. B. C." JOURNAL BEARING AND WEDGE. ATLANTIC BRASS CO., MAKERS.

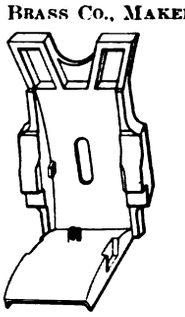
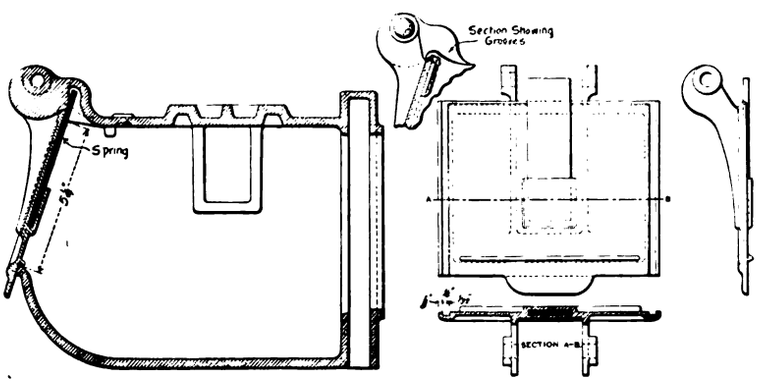


FIG. 4099. NATIONAL ADJUSTABLE JOURNAL BEARING. NATIONAL RY. SPECIALTY CO., MAKERS.



FIGS. 4102-4106. SHARP JOURNAL BOX.
THE HOLLAND CO., MAKERS.

FIG. 4107. McCORD JOURNAL BOX.
McCORD & CO., MAKERS.

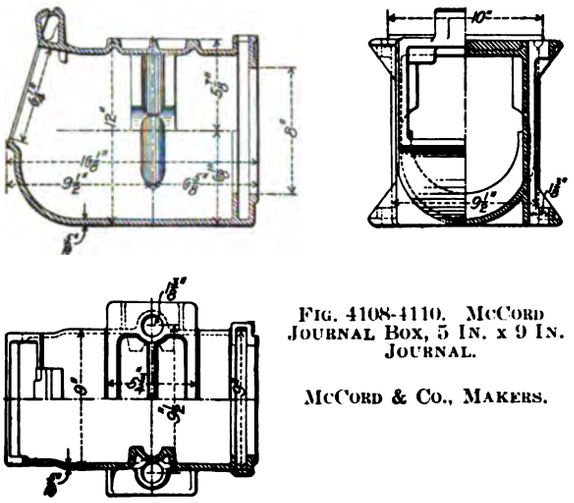
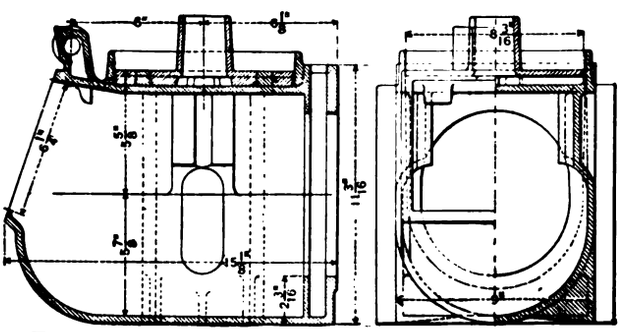


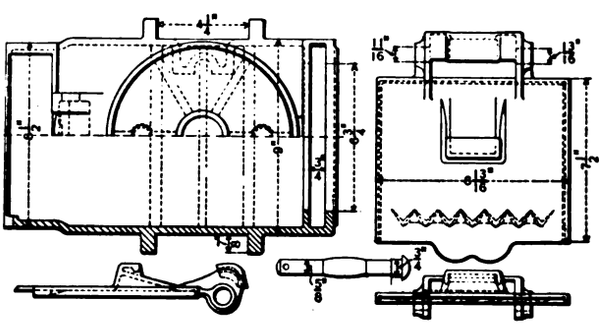
FIG. 4108-4110. MCCORD JOURNAL BOX, 5 IN. x 9 IN. JOURNAL.

MCCORD & CO., MAKERS.

FIG. 4111. GOULD JOURNAL BOX.
GOULD COUPLER CO., MAKERS.

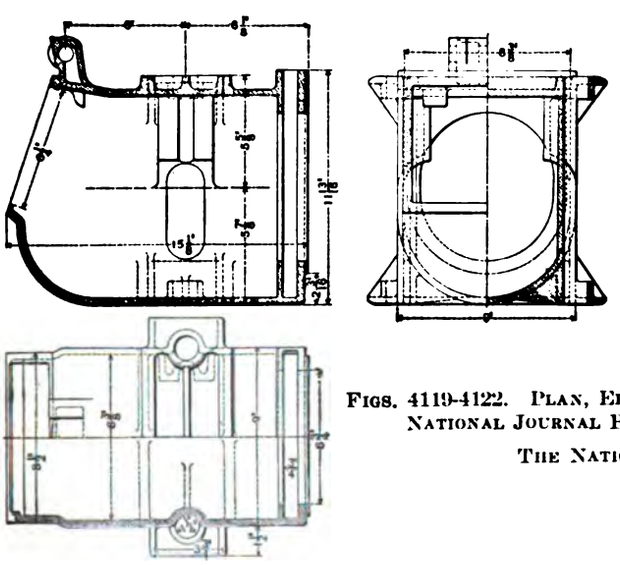


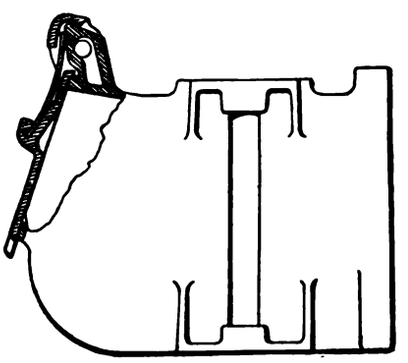
FIGS. 4112-4113. LONGITUDINAL AND CROSS SECTIONS.



FIGS. 4114-4118. PLAN OF BOX AND DETAILS OF LID.

NATIONAL JOURNAL BOX AND LID FOR 5 IN. x 9 IN. JOURNALS, PEDESTAL TRUCKS.





FIGS. 4119-4122. PLAN, ELEVATION, SECTION AND ARRANGEMENT OF LID AND SPRING.
NATIONAL JOURNAL BOX FOR 5 IN. x 9 IN. JOURNALS, ARCH BAR TRUCKS.

THE NATIONAL MALLEABLE CASTINGS CO., MAKERS.

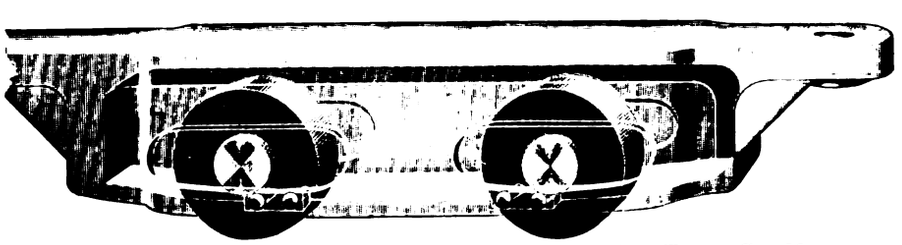
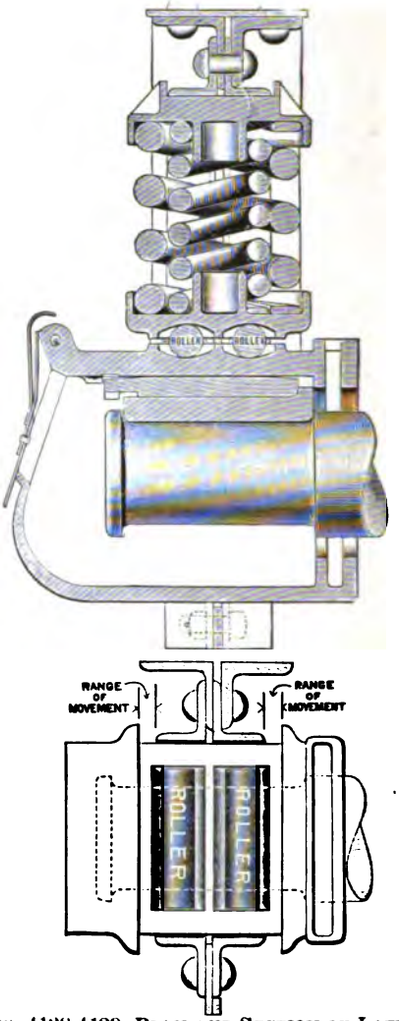


FIG. 4123. DOUBLE ROLLER SIDE BEARING. KINDL CAR TRUCK CO., MAKERS.

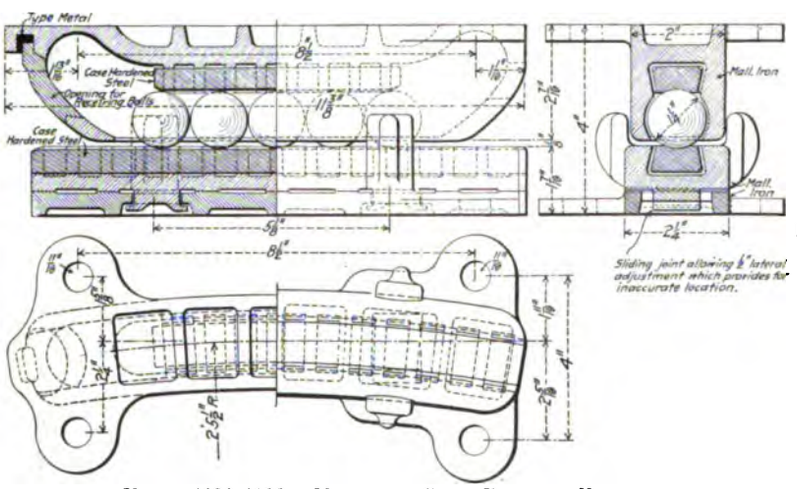
FIG. 4123A. HARRISON LUBRICATOR.
HARRISON DUST GUARD CO.

FIGS. 4124-4126. SINGLE ROLLER SIDE BEARING.
KINDL CAR TRUCK CO., MAKERS.

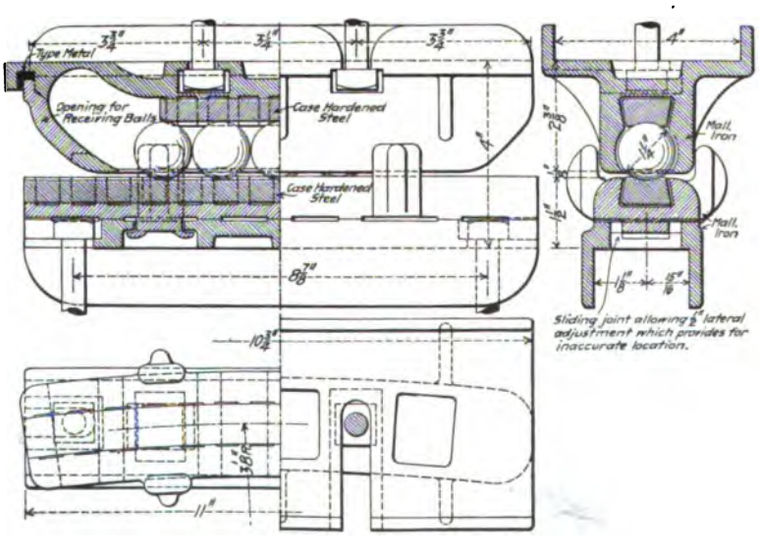
FIG. 4127. AUTOMATIC FRICTIONLESS SIDE BEARING.
CHICAGO RY. EQUIPMENT CO., MAKERS.



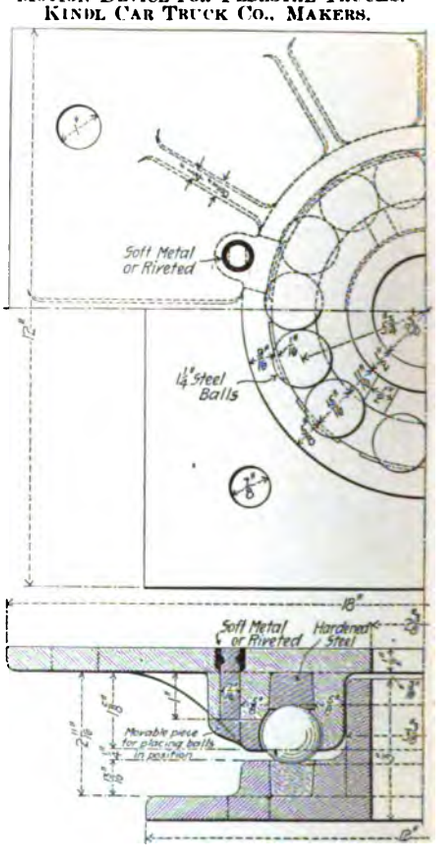
FIGS. 4128-4129. PLAN AND SECTION OF LATERAL MOTION DEVICE FOR PEDESTAL TRUCKS.
KINDL CAR TRUCK CO., MAKERS.



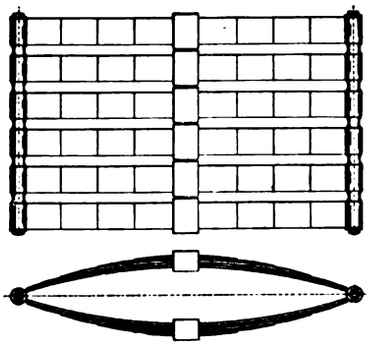
FIGS. 4130-4132. NORWOOD SIDE BEARING FREIGHT.
BALTIMORE RY. SPECIALTY CO., MAKERS.



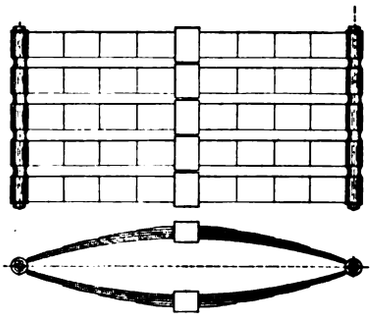
FIGS. 4133-4135. NORWOOD SIDE BEARING PASSENGER.
BALTIMORE RY. SPECIALTY CO. MAKERS.



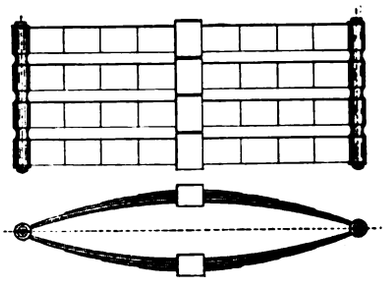
FIGS. 4136-4137. NORWOOD CENTER PLATE.
BALTIMORE RY. SPECIALTY CO., MAKERS.



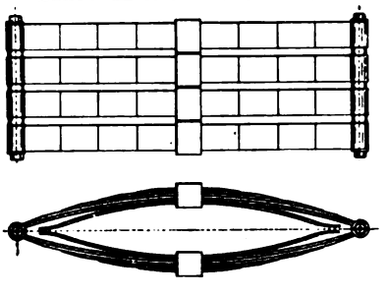
FIGS. 4138-4139.
SEXTUPLE ELLIPTIC SPRING.



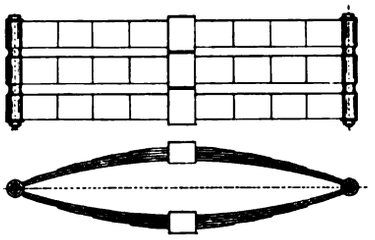
FIGS. 4140-4141.
QUINTUPLE ELLIPTIC SPRING.



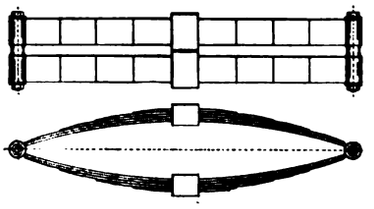
FIGS. 4142-4143.
QUADRUPLE ELLIPTIC SPRING.



FIGS. 4144-4145.
GRADUATED QUADRUPLE ELLIPTIC SPRING.



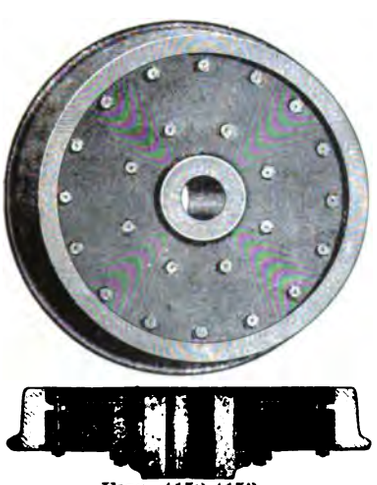
FIGS. 4146-4147.
TRIPLE ELLIPTIC SPRING.



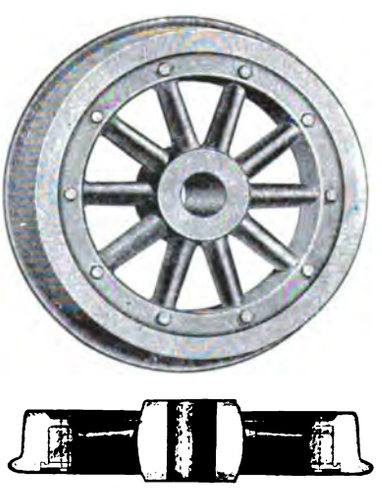
FIGS. 4148-4149.
DOUBLE ELLIPTIC SPRING.

FIG. 4150. MCCORD SPRING DAMPENER.
MCCORD & CO., MAKERS.

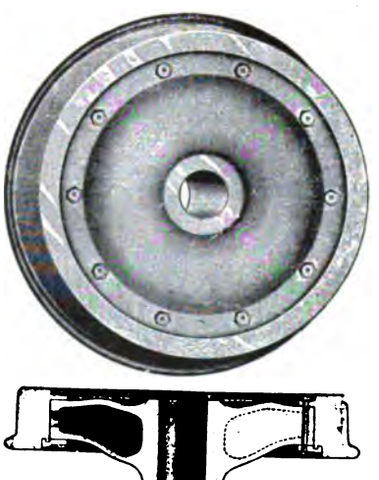
FIG. 4151. FOUR COIL BOLSTER SPRING.



FIGS. 4152-4153.
ALLEN WHEEL WITH PAPER CENTER.
TIRE SECURED BY PLATES AND BOLTS.



FIGS. 4154-4155.
CAST IRON SPOKE CENTER. TIRE IS
FASTENED WITH ONE RETAINING RING.

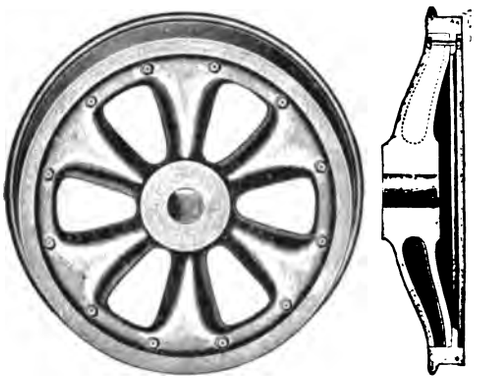


FIGS. 4156-4157.
WHEEL WITH CAST IRON DOUBLE PLATE
CENTER. TIRE SECURED BY ONE
RETAINING RING.

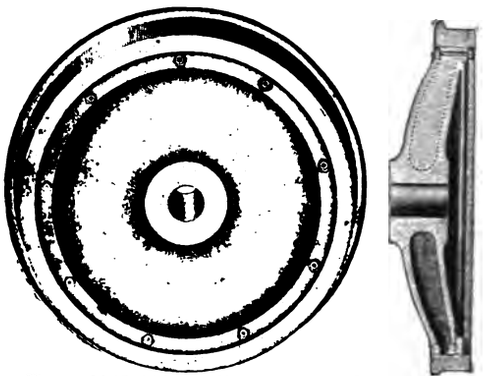
FIG. 4158.
CROSS SECTION OF WROUGHT IRON
PRESSED PLATE WHEEL.

FIG. 4159.
CROSS SECTION OF CAST IRON
DOUBLE PLATE WHEEL.

FIG. 4160.
CROSS SECTION OF CAST IRON
SPOKE WHEEL.

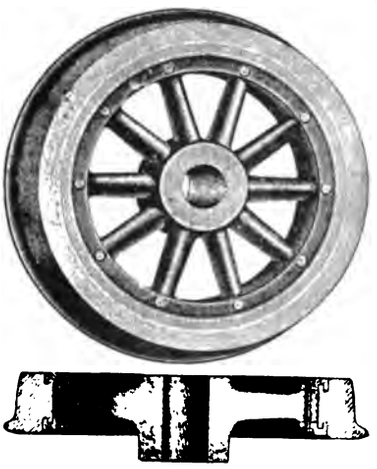


Figs. 4161-4162. Wheel with Cast Iron Spoke Center. Tire Shrunk on Center.



Figs. 4163-4164. Wheel with Cast Iron Double Plate Spoke Center.

Steel Tired Wheels for Electric Cars.



Figs. 4165-4166. Allen Wheel with Cast Iron Spoke Center. Tire Secured by Mansell Retaining Rings.

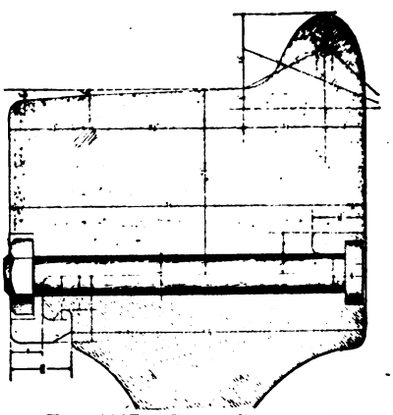


Fig. 4167. Cross Section of Tire Fastened with Bolt.

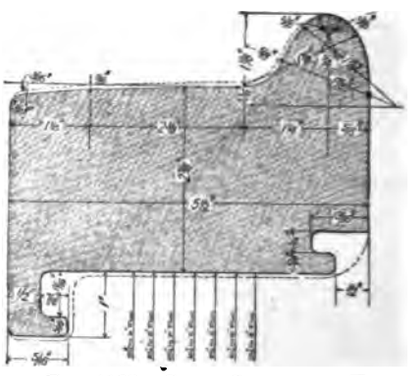
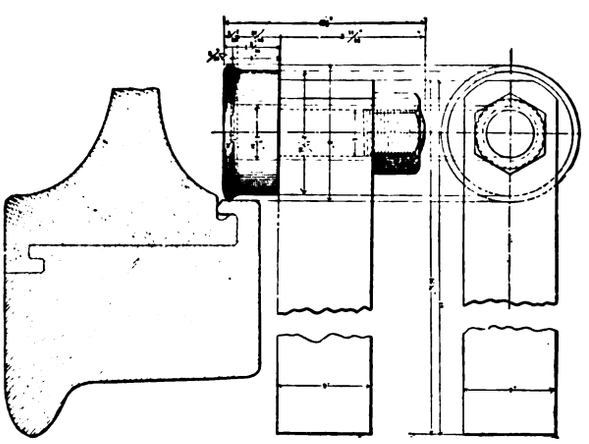
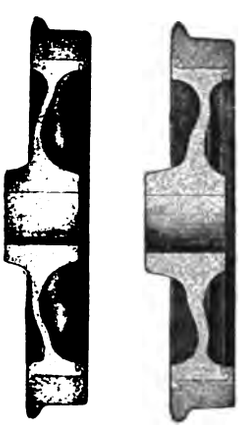


Fig. 4168. Cross Section of Tire, with Dimensions.

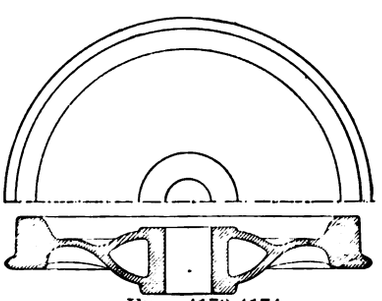
Boies Patent Steel Tired Wheels.



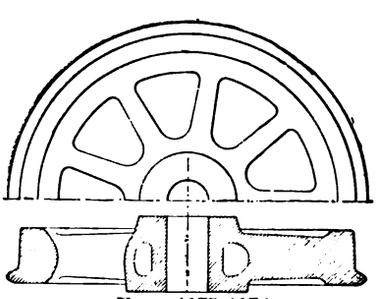
Figs. 4169-4170. Boies Integral Tire Lock and Tool for Rolling the Same.
Showing the manner in which the lip is rolled into the circumferential recess.



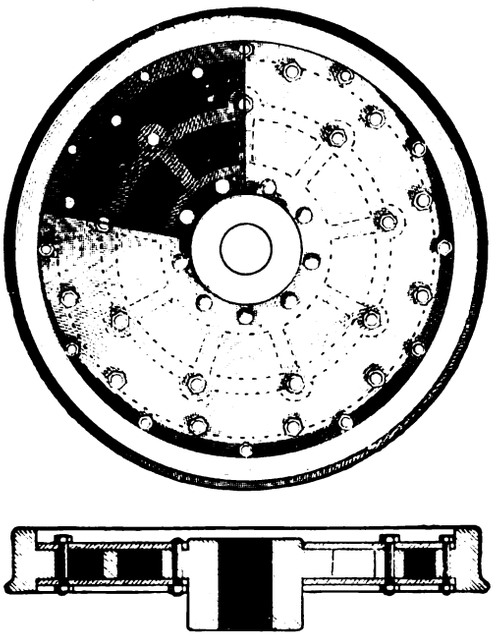
Figs. 4171-4172.
Boies Steel Tired Car Wheel.
Tire fastened with Integral Lock.
Wrought Iron Center.



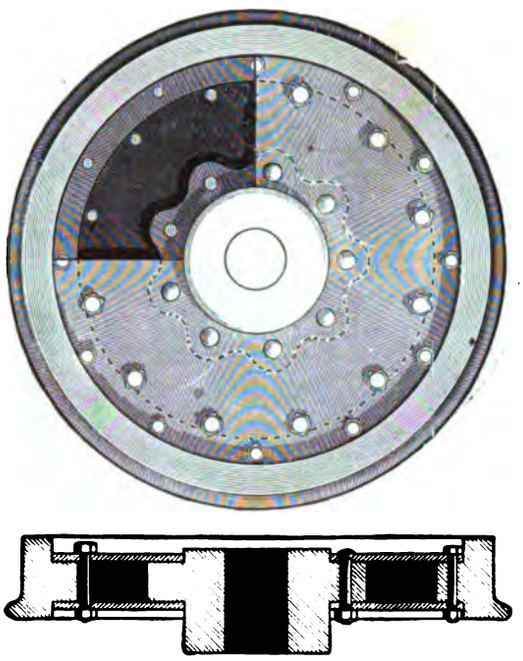
Figs. 4173-4174.
McKee, Fuller, Cast Iron Double Plate Center Wheel.
Center is cast into heated tire.



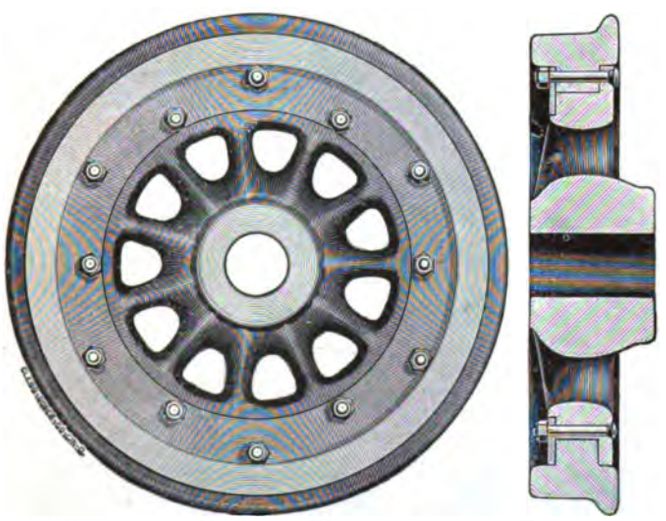
Figs. 4175-4176.
McKee, Fuller, Cast Iron Spoke Center Wheel.
Center is cast into heated tire.



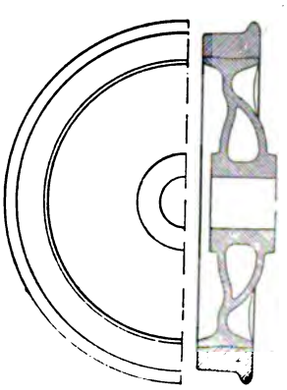
FIGS. 4177-4179.
PAIGE PLATE WHEEL WITH CAST IRON HUB.



FIGS. 4180-4181.
PAIGE PLATE WHEEL WITH CAST IRON HUB.
TIRE IS SECURED BY TWO SIDE PLATES OF ½-IN. STEEL, AND BOLTED WITH TURNED STEEL BOLTS.



FIGS. 4182-4183. PAIGE WHEEL FOR ENGINE TRUCK.
CAST IRON SPOKE CENTER.
TIRE SECURED BY A STEEL RETAINING RING.



FIGS. 4184-4185.
CAST IRON DOUBLE PLATE CENTER.

FIG. 4186.
HOLLOW SPOKE CAST WHEEL.
CENTER IS CAST INTO HEATED TIRE.
WASHBURN WHEEL.

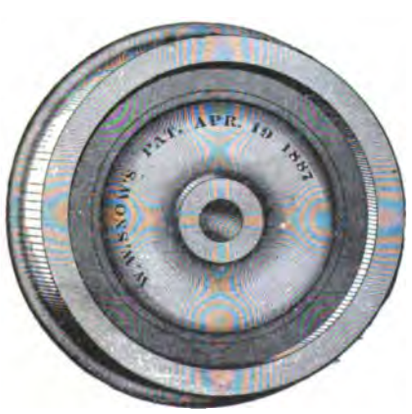
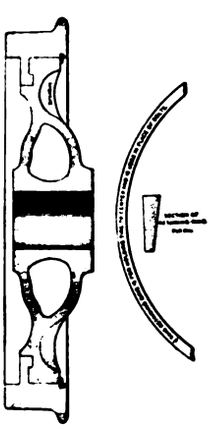


FIG. 4187.



FIGS. 4188-4190.
SNOW'S BOLTLESS STEEL TIRED DOUBLE PLATE WHEEL.
TIRE IS FASTENED TO CENTER BY RETAINING RING.

FIG. 4191.

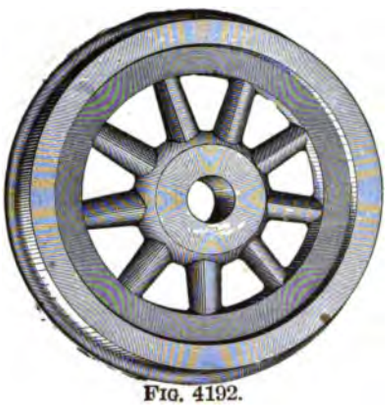


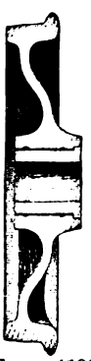
FIG. 4192.

FIG. 4193.
SNOW'S BOLTLESS STEEL TIRED SPOKE WHEEL.
TIRE IS FASTENED TO CENTER BY RETAINING RING.
RAILWAY STEEL-SPRING CO.

FIG. 4194.

FIG. 4195.
SECTION OF BOLTLESS FASTENING.

FIGS. 4196-4197. TAYLOR'S INTERLOCKED AND WELDED STEEL TIRED WHEEL.
THE STEEL TIRE AND IRON CENTER ARE WELDED TOGETHER.
TAYLOR IRON AND STEEL CO.



FIGS. 4198-4199. TAYLOR'S MANGANESE STEEL WHEEL.
WATER TOUGHENED.

FIGS. 4200-4201. NO. 3 KRUPP WHEEL.
CAST IRON SPOKE CENTER.
TIRE SECURED BY WROUGHT IRON RETAINING RINGS.

FIGS. 4202-4203. NO. 13 KRUPP PATENT SAFETY WHEEL.
WROUGHT IRON COIL DISC CENTER.
TIRE SECURED WITH SAFETY LOCK.

FIGS. 4204-4205. NO. 1 KRUPP WHEEL.
WROUGHT IRON COIL DISC CENTER.
TIRE SECURED BY WROUGHT IRON RETAINING RINGS.

THOMAS PROSSER & SON.

Steel Tired Coach and Car Wheels. Standard Steel Works, Makers.

Fig. 4206. Steel Tired Wheel with W. I. or C. S. Plate Center. Double Lip Retaining Ring.

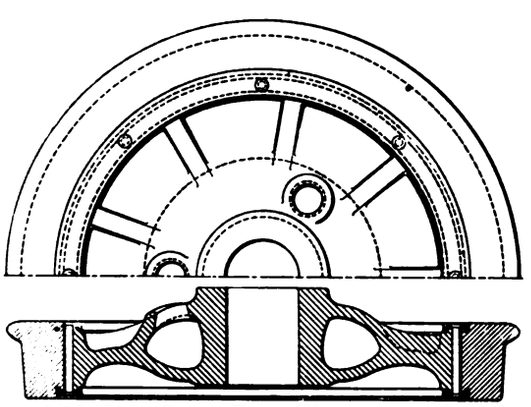
Fig. 4207. Steel Tired Wheel with Cast Iron Plate Center. Bolted Fastening.

Fig. 4208. Steel Tired Wheel with Cast Iron Spoke Center. Double Lip Retaining Ring.

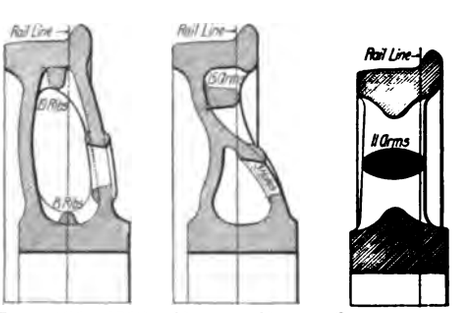
Fig. 4209. Steel Tired Wheel with W. I. or C. S. Spoke Center. Double Lip Retaining Ring.

Fig. 4210. Steel Tired Wheel with W. I. or C. S. Solid Plate Center. Bolted Fastening.

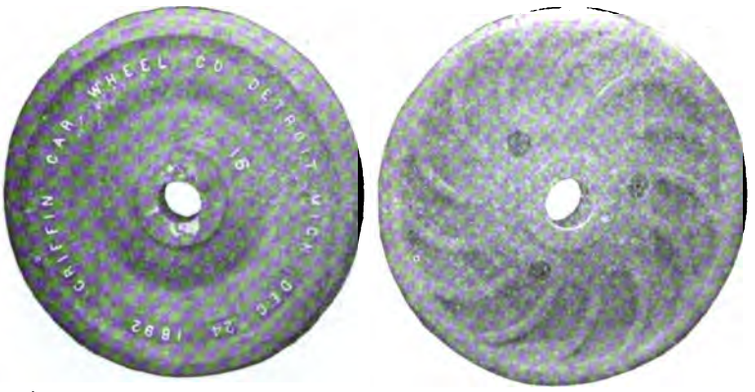
Fig. 4211. Steel Tired Wheel with C. S. or W. I. Spoke Center. Bolted Fastening.



Figs. 4212-4213. Steel Tired Wheel with Cast Iron Plate Center, Double Lip Retaining Rings.



Figs. 4214-4216. Double Plate, Combination and Spoke, Cast Iron Chilled Car Wheels. Lobdell Car Wheel Co.



FIGS. 4217-4218. CHILLED CAST WHEEL.
WITH CURVED RIBS OR BRACKETS.
GRIFFIN CAR WHEEL CO.

FIG. 4221.

FIGS. 4219-4220.
CAST CENTERS FOR STEEL TIRES.
GRIFFIN CAR WHEEL CO.

FIG. 4222. CHILLED CAST WHEEL,
WITH CURVED RIBS OR BRACKETS.

FIG. 4223.
CHILLED CAST IRON SPOKE WHEEL FOR ELECTRIC CARS.
KEYSTONE CAR WHEEL CO.

FIG. 4224.
CHILLED CAST IRON PLATE WHEEL.
KEYSTONE CAR WHEEL CO.

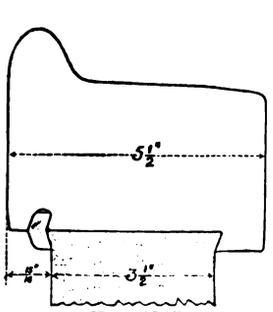


FIG. 4225.

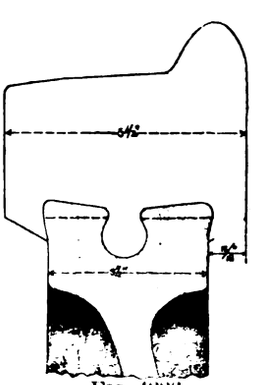


FIG. 4226.

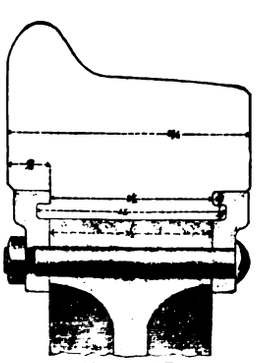


FIG. 4227.

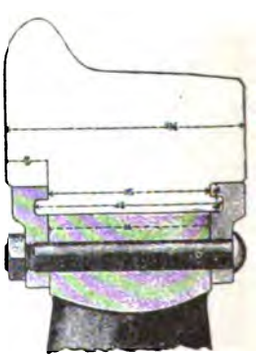


FIG. 4228.

THE GIBSON TIRE FASTENING. THE KRUPP SAFETY LOCK. THE MANSELL TIRE FASTENING. THE MANSELL TIRE FASTENING.
Fastenings for Steel Tired Wheels in General Use.

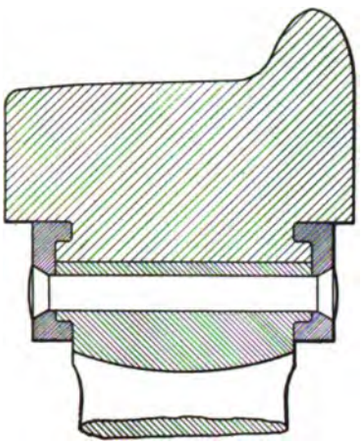


FIG. 4229. DOUBLE LIP RETAINING RING. 4 1/16 IN. SHRINK BASE.

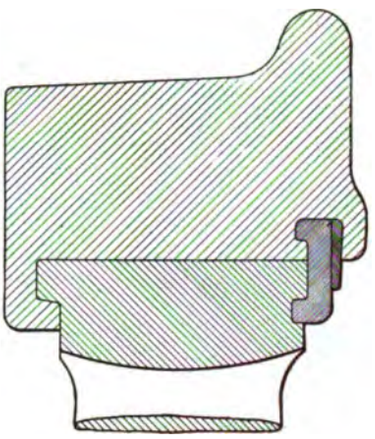


FIG. 4230. CARLETON-STROUDLEY FASTENING.

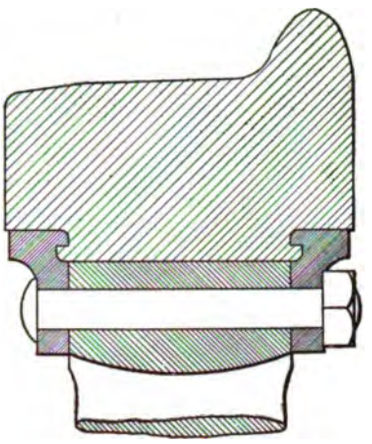


FIG. 4231. MANSELL RETAINING RING WITH BOLT AND NUT.

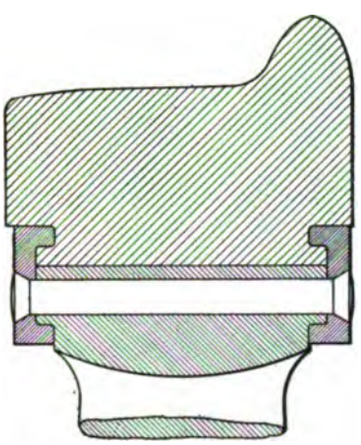


FIG. 4232. DOUBLE LIP RETAINING RING WITH 4⅝ IN. SHRINK BASE.

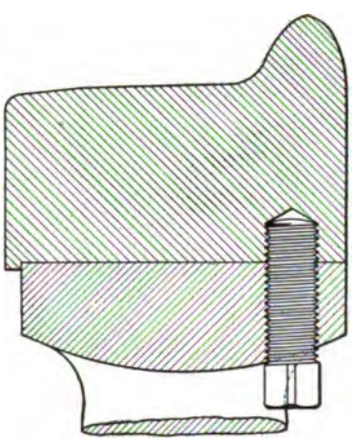


FIG. 4233. SET SCREW FASTENING.

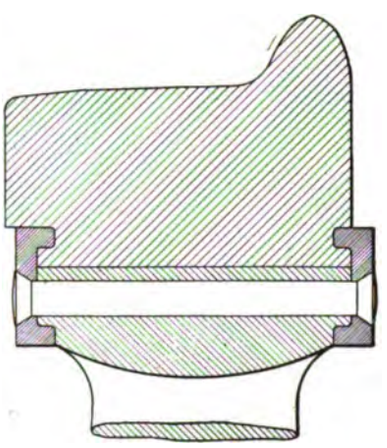


FIG. 4234. DOUBLE LIP RETAINING RING WITH 5 IN. SHRINK BASE.

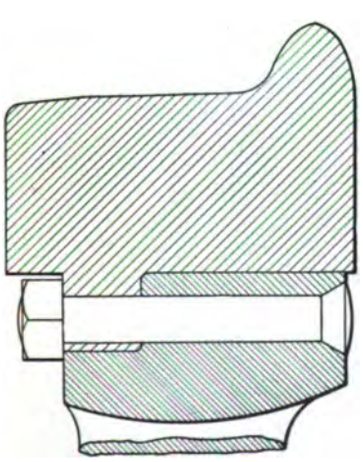


FIG. 4235. BOLTED FASTENING.

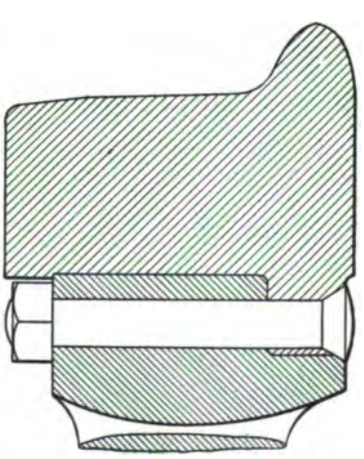


FIG. 4236. BOLTED FASTENING.

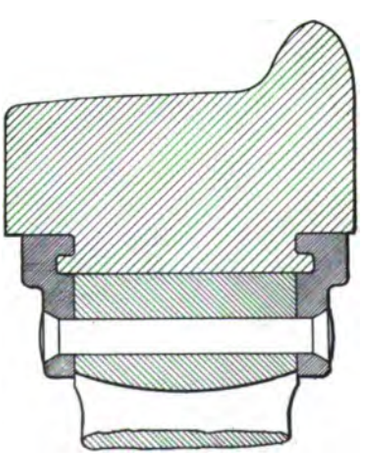
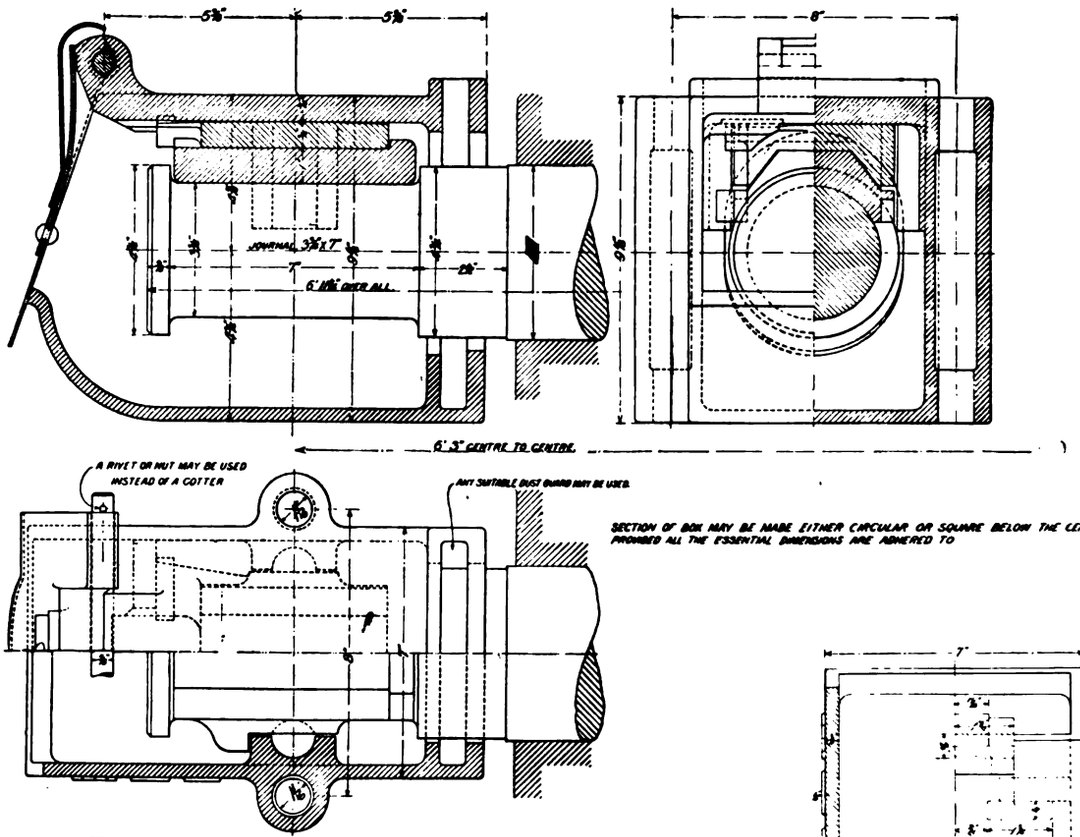
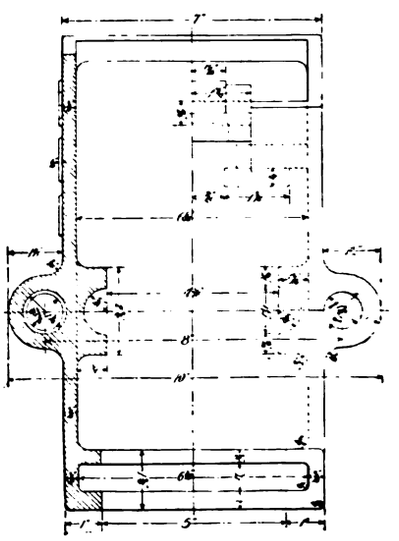


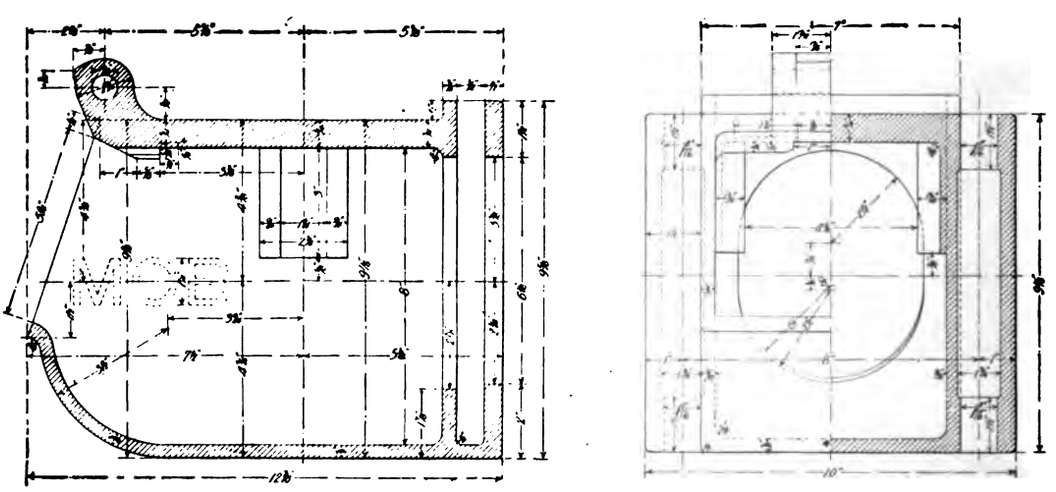
FIG. 4237. MANSELL RETAINING RING.

FASTENINGS FOR STEEL TIRES. STANDARD STEEL WORKS.


5⅝"
5⅝"
8"
JOURNAL 3¾" x 7"
6' 3" CENTRE TO CENTRE.
A RIVET OR NUT MAY BE USED INSTEAD OF A COTTER
ANY SUITABLE DUST GUARD MAY BE USED.
SECTION OF BOX MAY BE MADE EITHER CIRCULAR OR SQUARE BELOW THE CENTER LINE, PROVIDED ALL THE ESSENTIAL DIMENSIONS ARE ADHERED TO



FIGS. 4238-4240. STANDARD JOURNAL BOX AND CONTAINED PARTS FOR JOURNAL 3¾ IN. X 7 IN. SHEET 1.



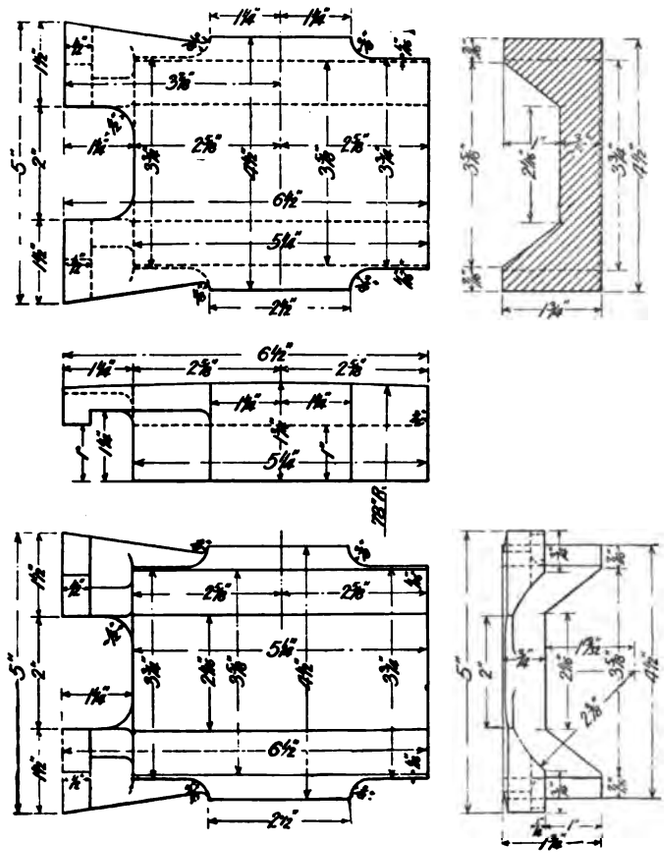
WIDTH OF BOX OVER ALL WHERE LID FITS SHOULD BE 7⅛ INCHES OR INCLOSURE WITH BALLOT OR 7⅛ INSTEAD OF 7 INCHES AS SHOWN HERE SEE PLATE M-8 PROCEEDINGS 1915

NOTE

IF THE METHOD OF MOULDING DOES NOT PERMIT OF PLACING THE LETTERS M.C.B. ON THE SIDE OF THE JOURNAL BOX, THEY MAY BE PLACED ON THE TOP, BETWEEN THE HINGE LUG & THE ARCH BAR SEAT.

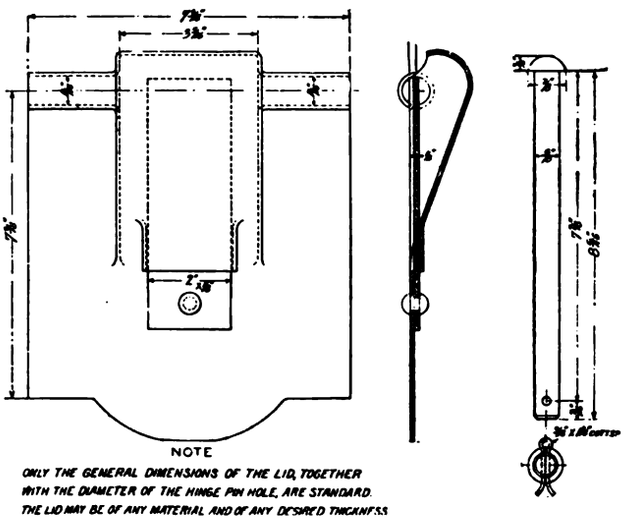
SECTION OF BOX MAY BE MADE EITHER CIRCULAR OR SQUARE BELOW THE CENTER LINE, PROVIDED ALL THE ESSENTIAL DIMENSIONS ARE ADHERED TO.
WHEN JOURNAL BOX IS MADE OF MALLEABLE IRON, REDUCTION IN THICKNESS OF METAL AND CORING TO LIGHTEN WEIGHT IS PERMISSIBLE, PROVIDED ALL THE ESSENTIAL DIMENSIONS WHICH AFFECT INTERCHANGEABILITY AND THE PROPER FITTING OF CONTAINED PARTS, ARE ADHERED TO.

FIGS. 4241-4243. STANDARD JOURNAL BOX FOR JOURNAL 3¾ IN. X 7 IN. SHEET 2.

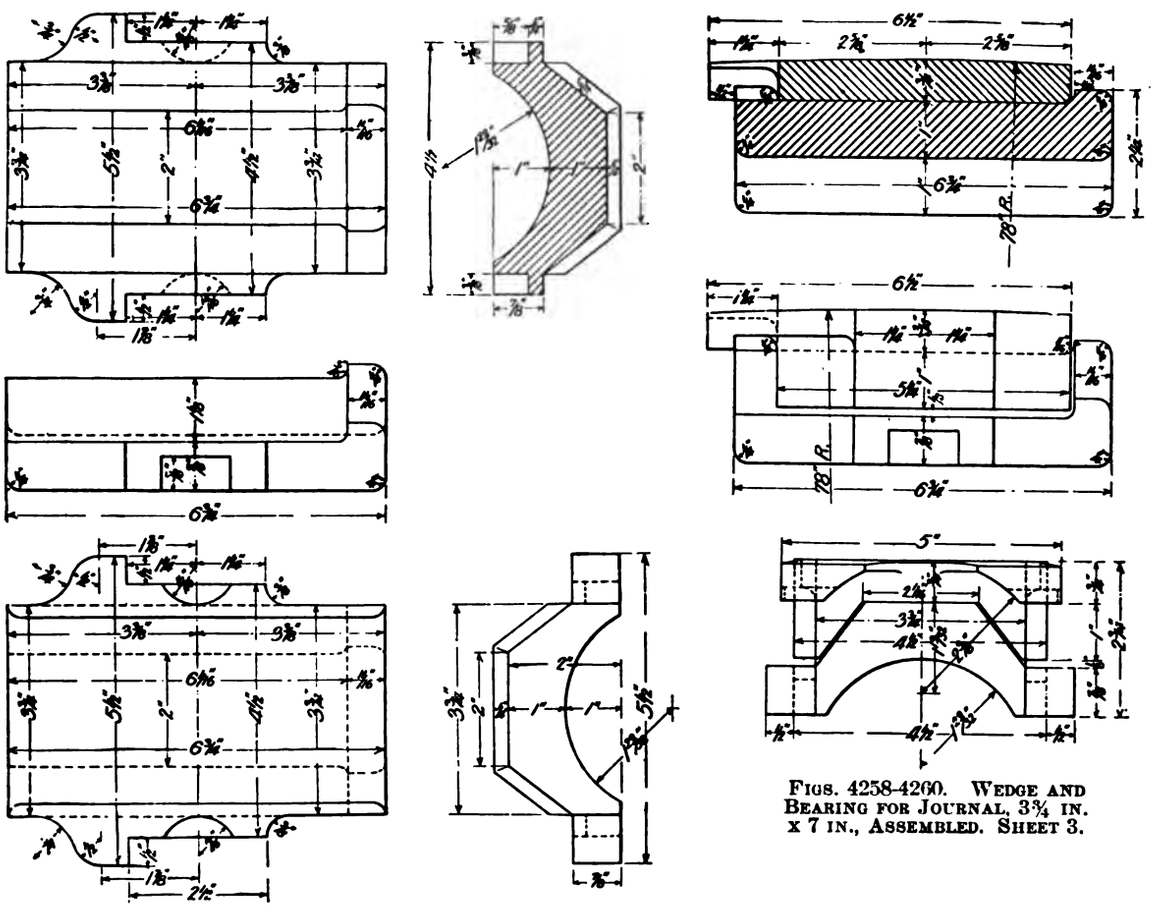


FIGS. 4244-4248. WEDGE FOR JOURNAL 3¾ IN. X 7 IN. SHEET 3.

NOTE.—Skeleton wedge of malleable iron or steel may be used provided the essential dimensions are adhered to. The lid spring may be of any design and may be secured to the lid by any practicable method provided that it works properly on the standard box and is of the designated section, 2 in. x ⅛ in. A rivet or nut may be used instead of a cotter in hinge pin if preferred.

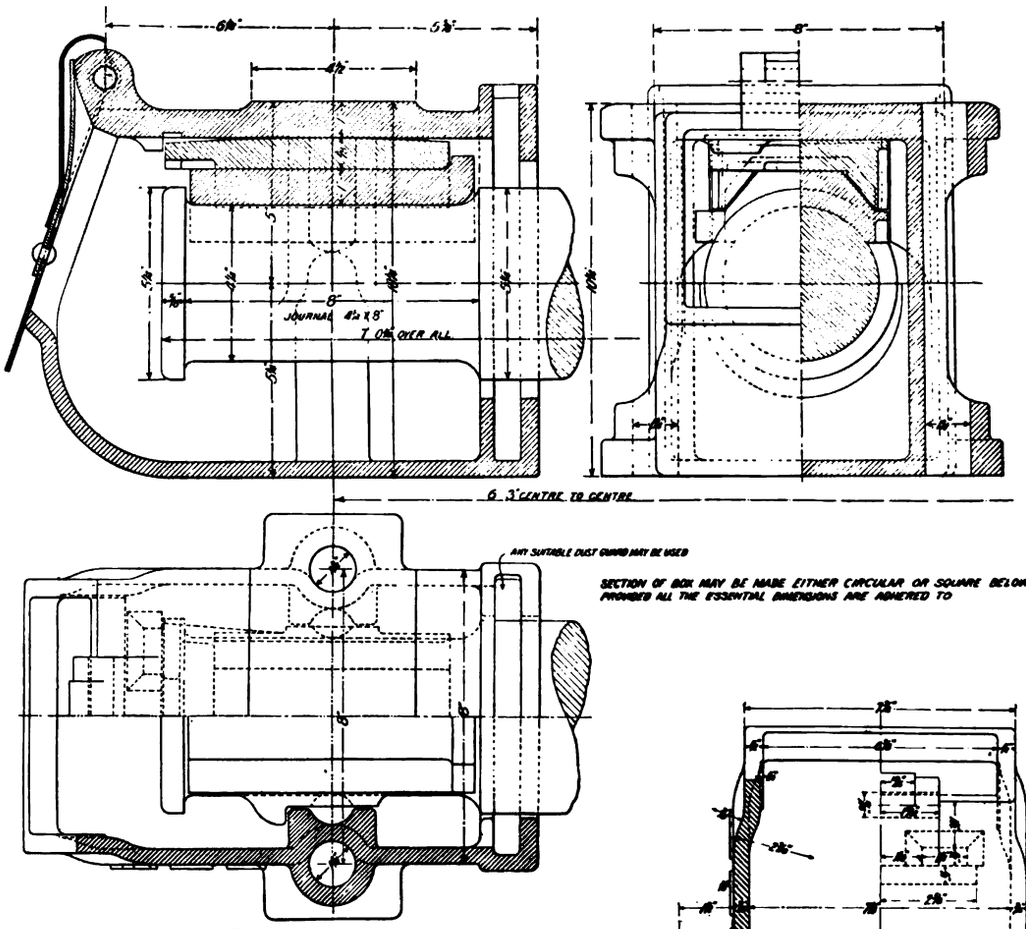

NOTE
ONLY THE GENERAL DIMENSIONS OF THE LID, TOGETHER WITH THE DIAMETER OF THE HINGE PIN HOLE, ARE STANDARD. THE LID MAY BE OF ANY MATERIAL AND OF ANY DESIRED THICKNESS.

FIGS. 4249-4252. JOURNAL BOX LID AND PIN FOR JOURNAL 3¾ IN. X 7 IN. SHEET 3.

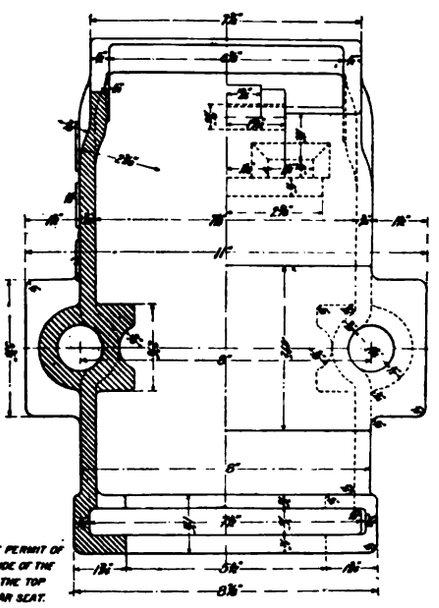


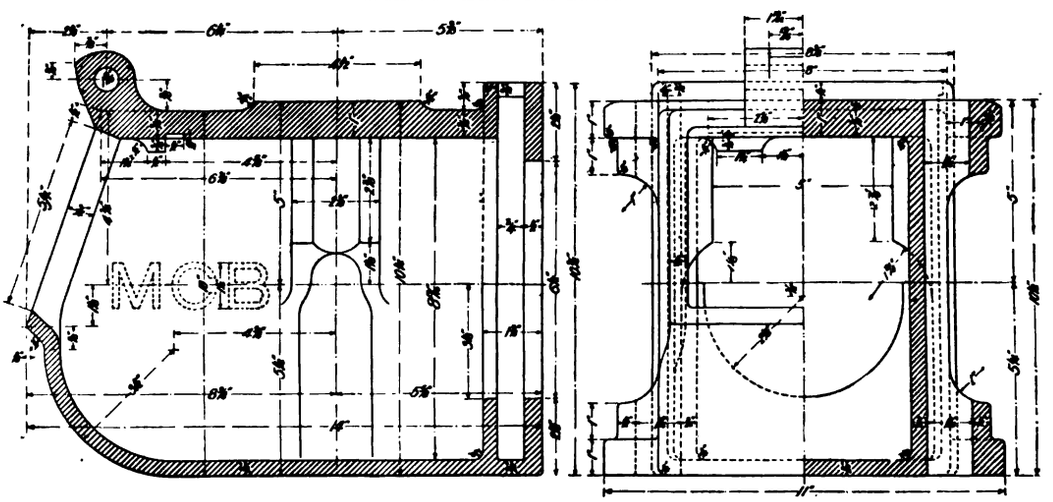
FIGS. 4253-4257. BEARING FOR JOURNAL, 3¾ IN. X 7 IN. SHEET 3.

FIGS. 4258-4260. WEDGE AND BEARING FOR JOURNAL, 3¾ IN. X 7 IN., ASSEMBLED. SHEET 3.

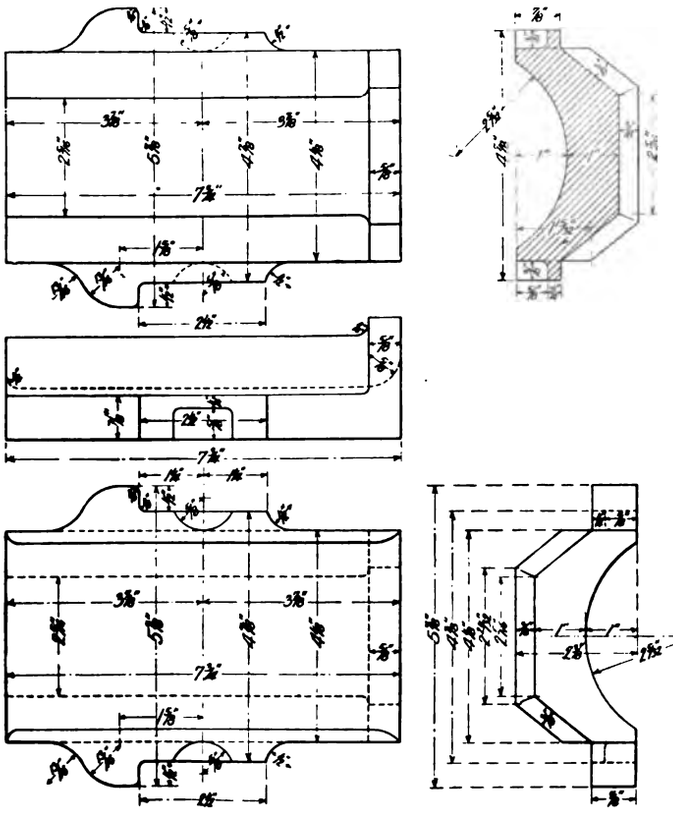

JOURNAL 4½ X 8"
6" CENTRE TO CENTRE
ANY SUITABLE DUST GUARD MAY BE USED
SECTION OF BOX MAY BE MADE EITHER CIRCULAR OR SQUARE BELOW THE CENTER LINE. PROVIDED ALL THE ESSENTIAL DIMENSIONS ARE ADHERED TO

FIGS. 4261-4263.
STANDARD JOURNAL BOX AND CONTAINED PARTS FOR JOURNAL, 4¼ IN. X 8 IN. SHEET 4.

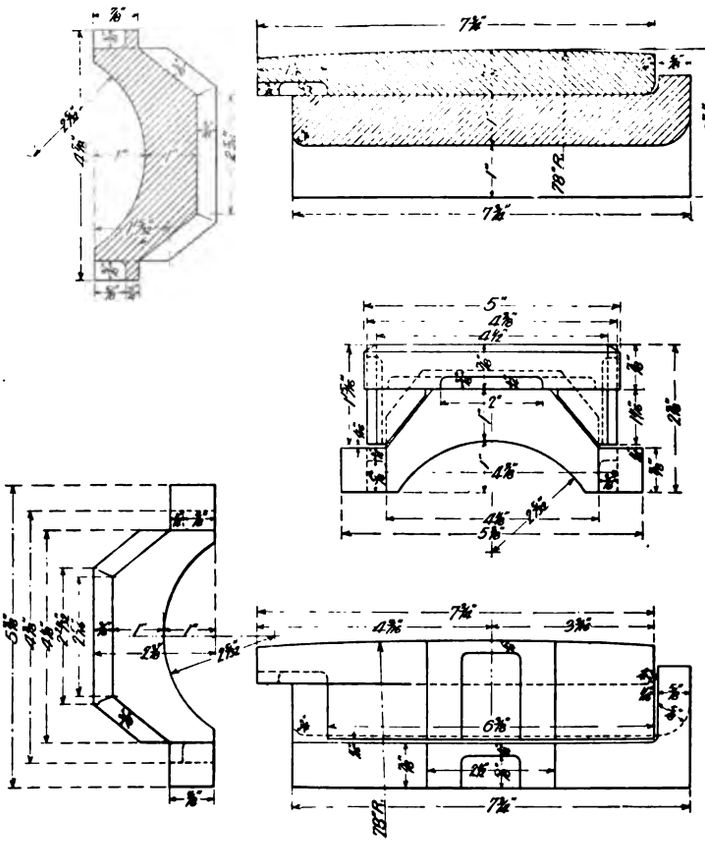

NOTE
IF THE METHOD OF MOULDING DOES NOT PERMIT OF PLACING THE LETTERS M.C.B. ON THE SIDE OF THE JOURNAL BOX, THEY MAY BE PLACED ON THE TOP BETWEEN THE HINGE LUG & THE ARCH BAR SEAT.


M.C.B.
SECTION OF BOX MAY BE MADE EITHER CIRCULAR OR SQUARE BELOW THE CENTER LINE. PROVIDED ALL THE ESSENTIAL DIMENSIONS ARE ADHERED TO. WHEN JOURNAL BOX IS MADE OF MALLEABLE IRON, REDUCTION IN THICKNESS OF METAL AND CORING TO LIGHTEN WEIGHT IS PERMISSIBLE, PROVIDED ALL THE ESSENTIAL DIMENSIONS WHICH AFFECT INTERCHANGEABILITY AND THE PROPER FITTING OF CONTAINED PARTS, ARE ADHERED TO.

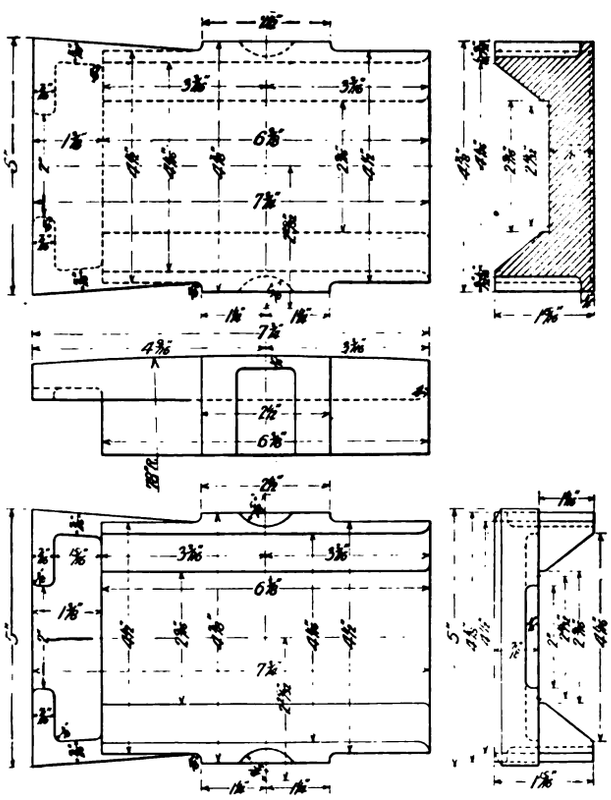
FIGS. 4264-4266. STANDARD JOURNAL BOX FOR JOURNAL, 4¼ IN. X 8 IN. SHEET 5.



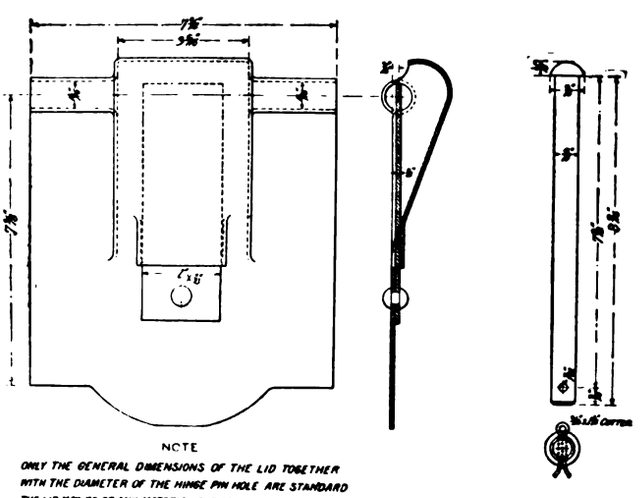
FIGS. 4267-4271. BEARING FOR JOURNAL, 4¼ IN. x 8 IN. SHEET 6.



FIGS. 4272-4274. BEARING AND WEDGE FOR JOURNAL, 4¼ IN. x 8 IN., ASSEMBLED. SHEET 6.

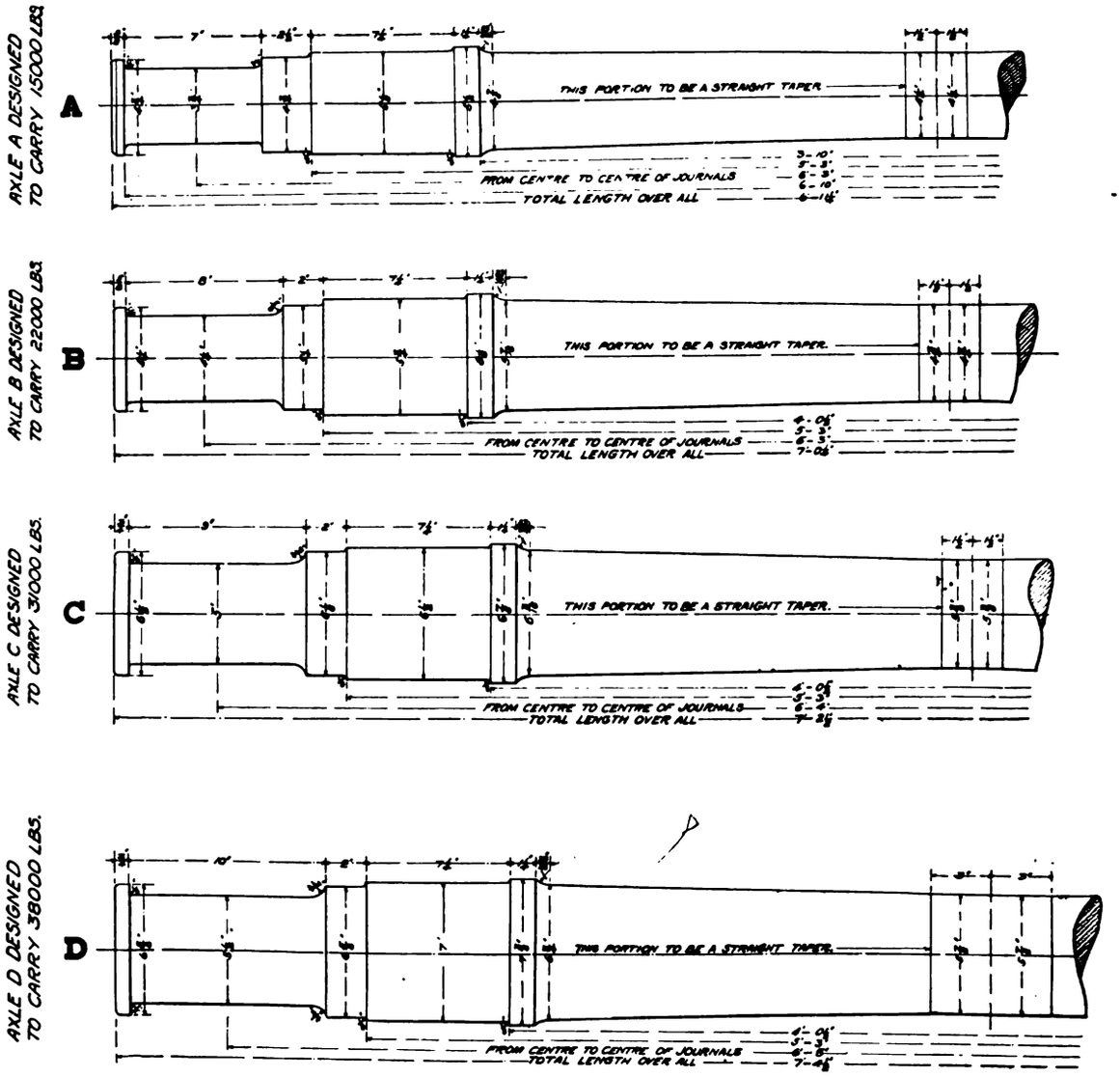


FIGS. 4275-4279. WEDGE FOR JOURNAL, 4¼ IN. x 8 IN. SHEET 6.

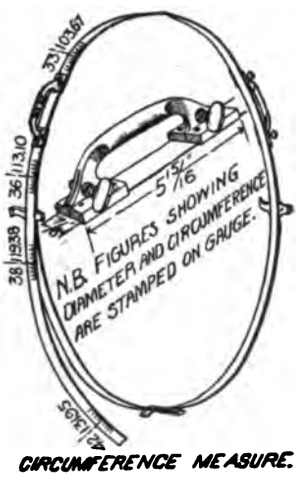

NOTE
ONLY THE GENERAL DIMENSIONS OF THE LID TOGETHER WITH THE DIAMETER OF THE HINGE PIN HOLE ARE STANDARD THE LID MAY BE OF ANY MATERIAL, AND OF ANY DESIRED THICKNESS

FIGS. 4280-4283. JOURNAL BOX LID AND PIN FOR JOURNAL, 4¼ IN. x 8 IN. SHEET 6.

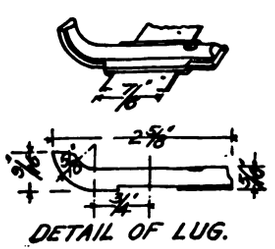
NOTE.—Skeleton wedge of malleable iron or steel may be used provided the essential dimensions are adhered to. The lid spring may be of any design and may be secured to the lid by any practicable method provided that it works properly on the standard box and is of the designated section, 2 in. x ⅛ in. A rivet or nut may be used instead of a cotter in hinge pin if preferred.


AXLE A DESIGNED TO CARRY 15000 LBS.
A
THIS PORTION TO BE A STRAIGHT TAPER.
FROM CENTRE TO CENTRE OF JOURNALS
TOTAL LENGTH OVER ALL
AXLE B DESIGNED TO CARRY 22000 LBS.
B
THIS PORTION TO BE A STRAIGHT TAPER.
FROM CENTRE TO CENTRE OF JOURNALS
TOTAL LENGTH OVER ALL
AXLE C DESIGNED TO CARRY 31000 LBS.
C
THIS PORTION TO BE A STRAIGHT TAPER.
FROM CENTRE TO CENTRE OF JOURNALS
TOTAL LENGTH OVER ALL
AXLE D DESIGNED TO CARRY 38000 LBS.
D
THIS PORTION TO BE A STRAIGHT TAPER.
FROM CENTRE TO CENTRE OF JOURNALS
TOTAL LENGTH OVER ALL

FIGS. 4284-4287. STANDARD AXLES. SHEET 7.



CIRCUMFERENCE MEASURE.



FIGS. 4288-4291. STANDARD CIRCUMFERENCE MEASURE. SHEET 7.

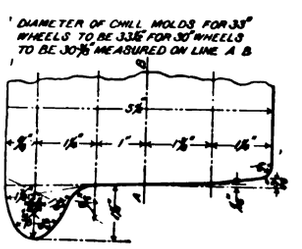
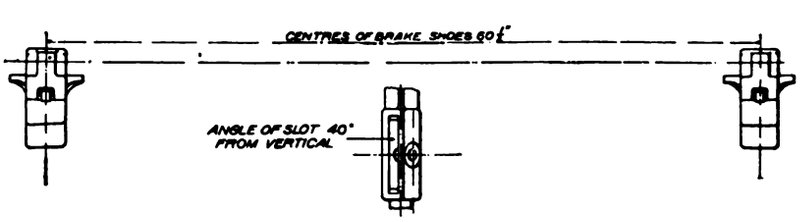
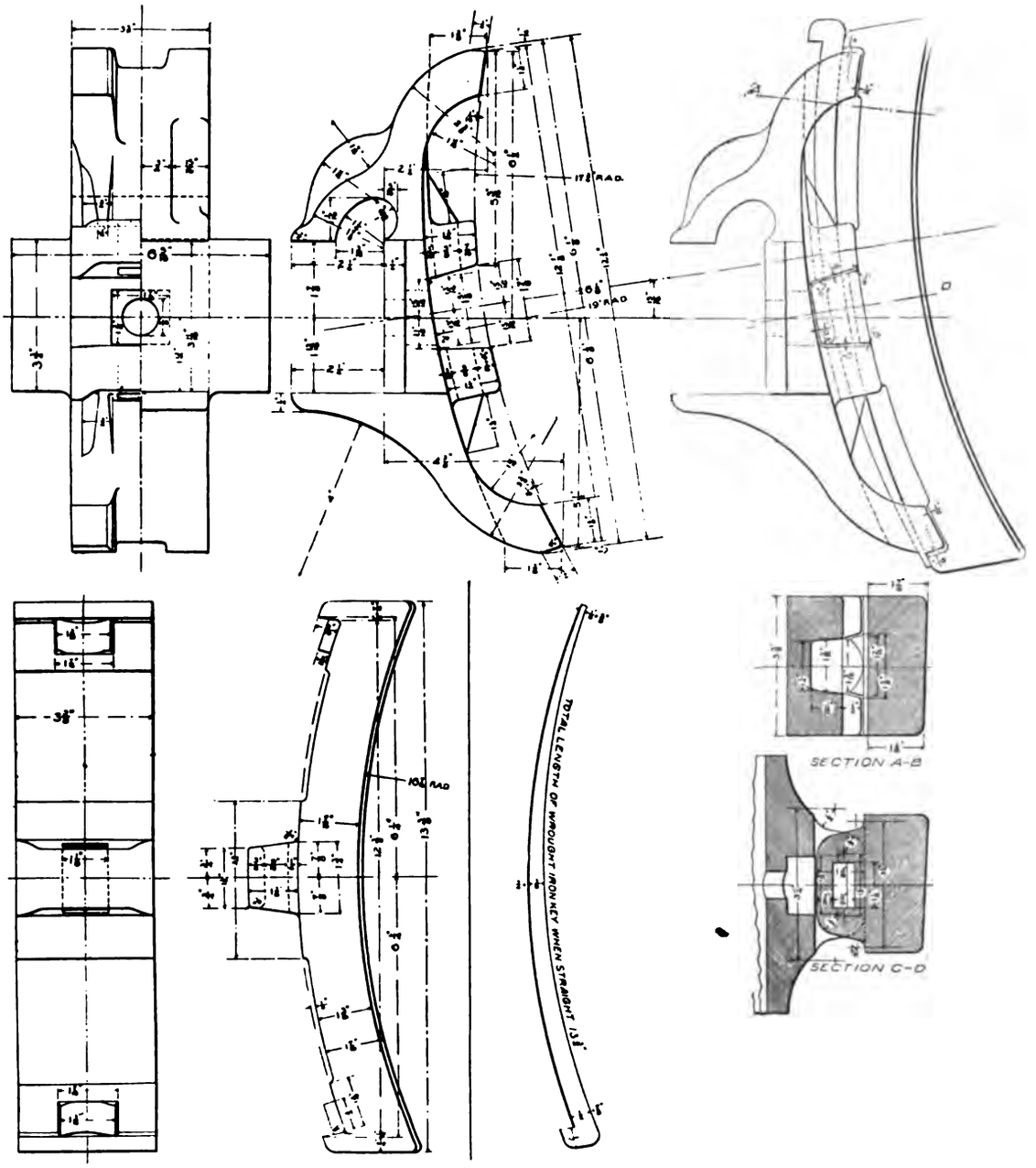


FIG. 4292. STANDARD WHEEL TREAD AND FLANGE. SHEET 7.

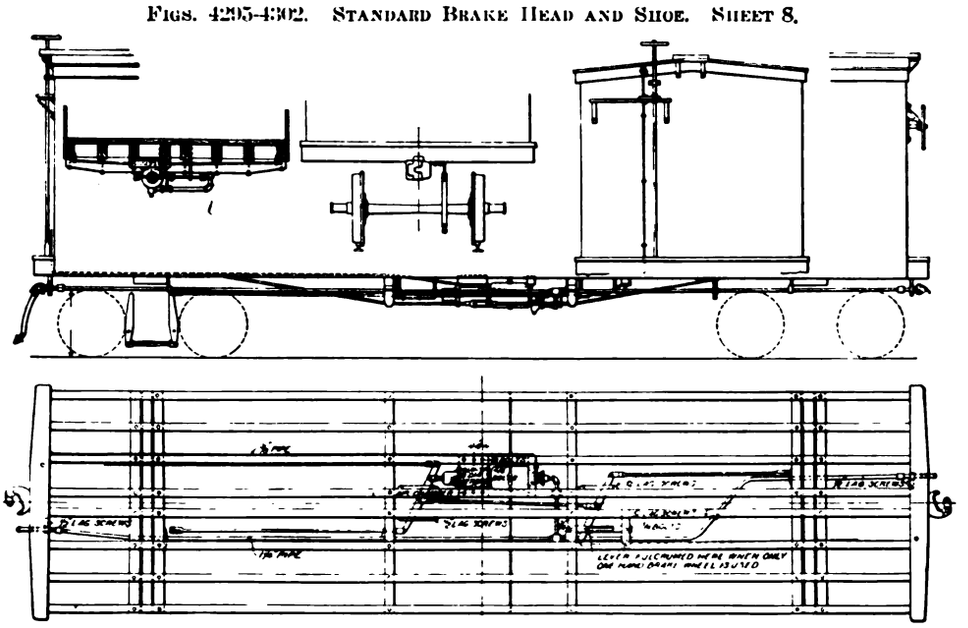


HEIGHT-TOP OF RAIL TO CENTRE OF NEW SHOE
FOR INSIDE HUNG BEAMS 13 INCHES
OUTSIDE " " 14½ "

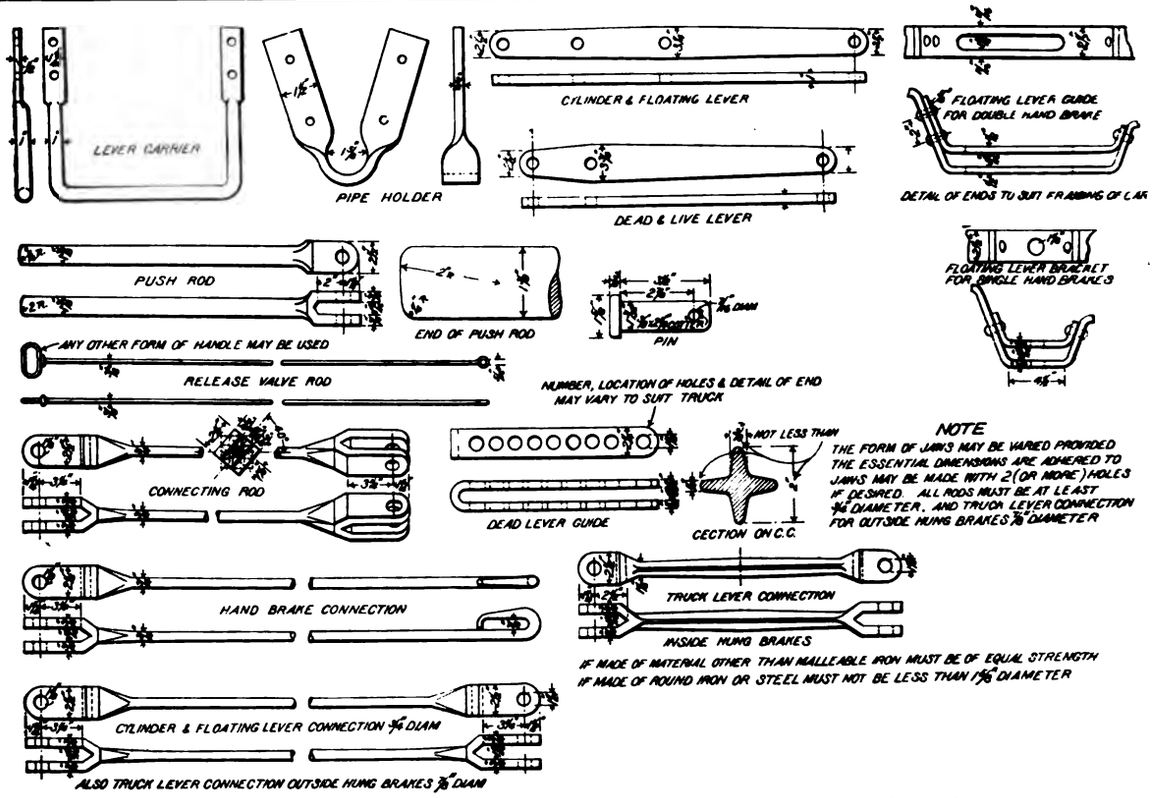
FIGS. 4293-4294. STANDARD DIMENSIONS FOR IRON BRAKE BEAMS. SHEET 8.



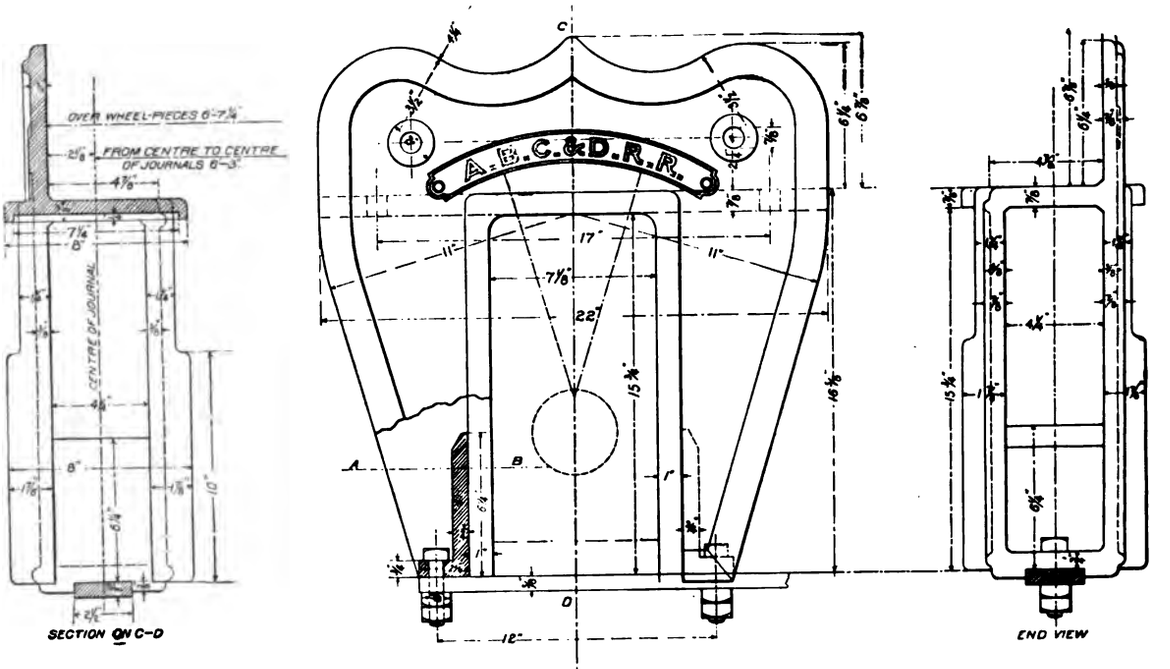
FIGS. 4295-4302. STANDARD BRAKE HEAD AND SHOE. SHEET 8.



(321) FIGS. 4303-4307. STANDARD GENERAL ARRANGEMENT OF AIR BRAKES ON FREIGHT CARS. SHEET 9.


LEVER CARRIER
PIPE HOLDER
CYLINDER & FLOATING LEVER
DEAD & LIVE LEVER
FLOATING LEVER GUIDE FOR DOUBLE HAND BRAKE
DETAIL OF ENDS TO SUIT FRAMING OF CAR
FLOATING LEVER BRACKET FOR SINGLE HAND BRAKES
PUSH ROD
END OF PUSH ROD
PIN
ANY OTHER FORM OF HANDLE MAY BE USED
RELEASE VALVE ROD
NUMBER, LOCATION OF HOLES & DETAIL OF END MAY VARY TO SUIT TRUCK
CONNECTING ROD
DEAD LEVER GUIDE
SECTION ON C.C.
NOTE
THE FORM OF JAWS MAY BE VARIED PROVIDED THE ESSENTIAL DIMENSIONS ARE ADHERED TO JAWS MAY BE MADE WITH 2 (OR MORE) HOLES IF DESIRED. ALL RODS MUST BE AT LEAST ⅝" DIAMETER, AND TRUCK LEVER CONNECTION FOR OUTSIDE HUNG BRAKES ⅞" DIAMETER
HAND BRAKE CONNECTION
TRUCK LEVER CONNECTION
INSIDE HUNG BRAKES
IF MADE OF MATERIAL OTHER THAN MALLEABLE IRON MUST BE OF EQUAL STRENGTH
IF MADE OF ROUND IRON OR STEEL MUST NOT BE LESS THAN 1⅝" DIAMETER
CYLINDER & FLOATING LEVER CONNECTION ¾" DIAM
ALSO TRUCK LEVER CONNECTION OUTSIDE HUNG BRAKES ⅞" DIAM

FIGS. 4308-4336. STANDARD DETAILS OF FOUNDATION BRAKE GEAR. SHEET 9.



FIGS. 4337-4339. STANDARD PEDESTAL FOR JOURNALS 3¾ IN. X 7 IN. SHEET 10.

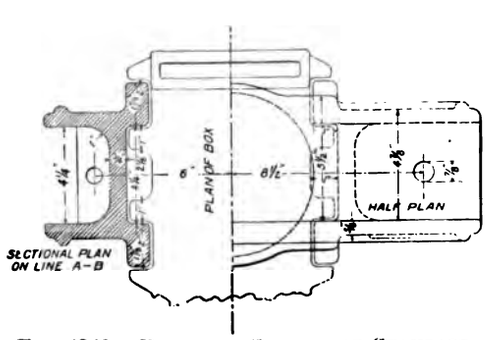
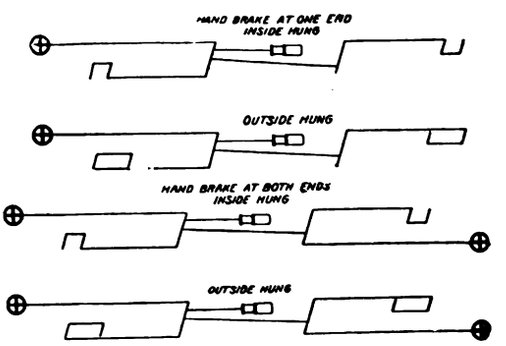
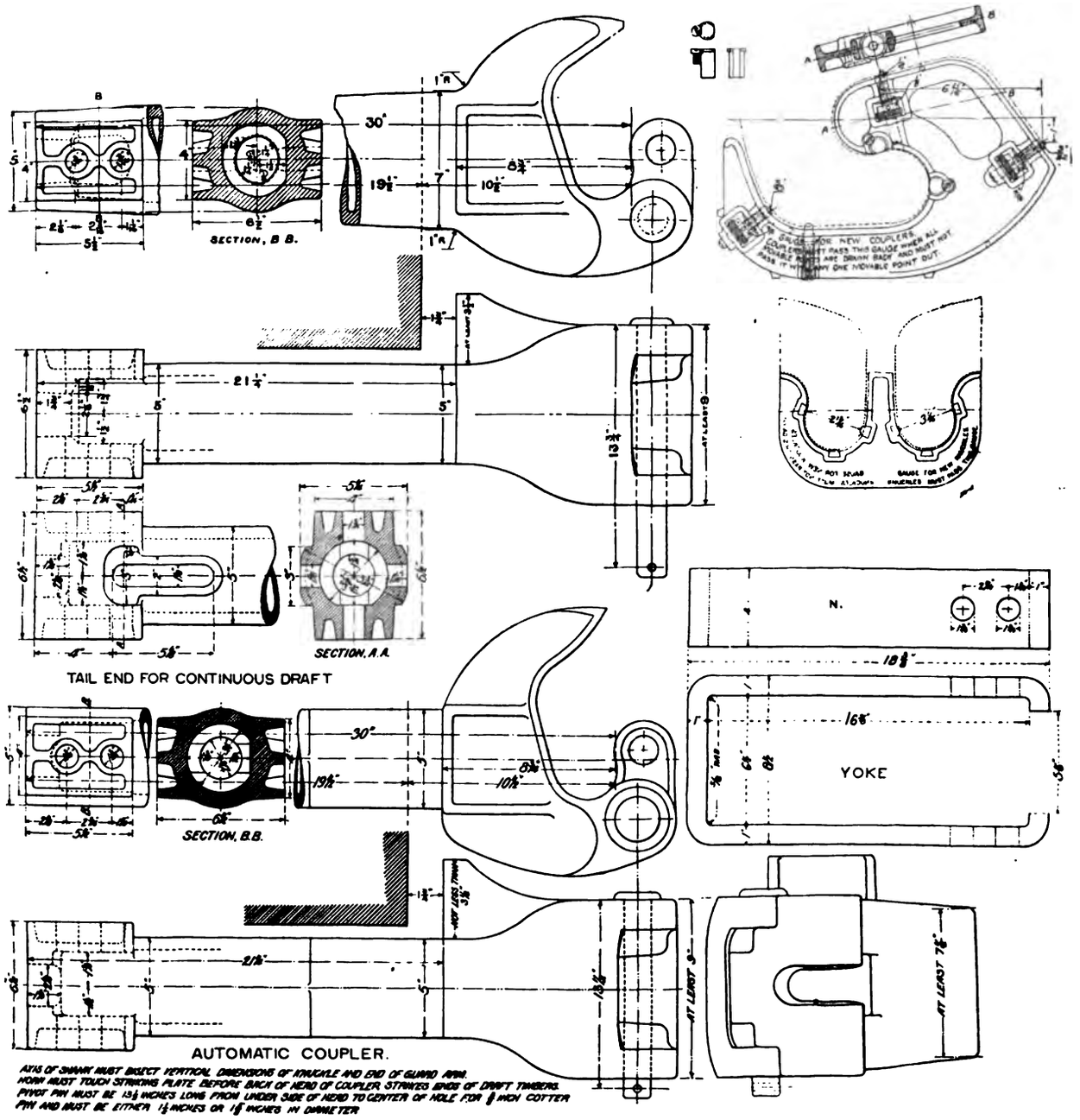


FIG. 4340. PLAN AND SECTION OF STANDARD PEDESTAL FOR JOURNAL 3¾ IN. X 7 IN. SHEET 10.



FIGS. 4341-4344. LEVERS AND CONNECTIONS. SHEET 9.


SECTION, B B.
SECTION, A A.
TAIL END FOR CONTINUOUS DRAFT
YOKE
SECTION, B.B.
AUTOMATIC COUPLER.
AXIS OF SHANK MUST BISECT VERTICAL DIMENSIONS OF KNUCKLE AND END OF GUARD ARM.
HORN MUST TOUCH STRIKING PLATE BEFORE BACK OF HEAD OF COUPLER STRIKES ENDS OF DRAFT TIMBERS.
PIVOT PIN MUST BE 13⅛ INCHES LONG FROM UNDER SIDE OF HEAD TO CENTER OF HOLE FOR ⅞ INCH COTTER
PIN AND MUST BE EITHER 1¼ INCHES OR 1⅝ INCHES IN DIAMETER

FIGS. 4345-4361. STANDARD AUTOMATIC COUPLER WITH 5 IN. X 5 IN. AND 5 IN. X 7 IN. SHANK. STANDARD LIMIT GAGES AND YOKE. SHEET 11.

FIGS. 4363-4365. STANDARD BUFFER BLOCK AND LOCATION. SHEET 11.

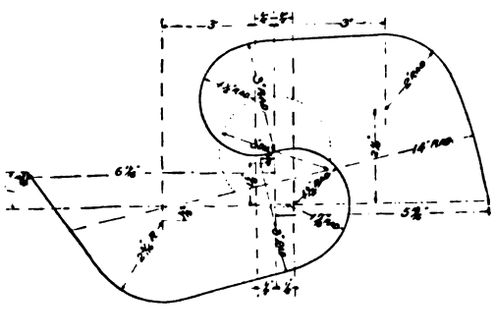


FIG. 4362. FORM OF STANDARD CONTOUR LINE FOR COUPLERS. SHEET 11.

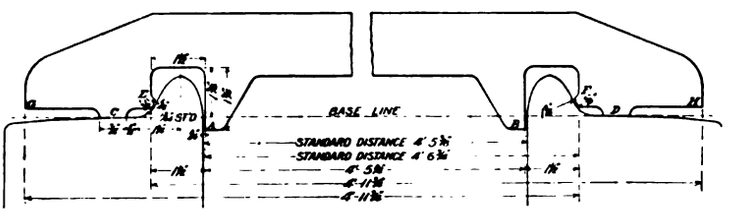
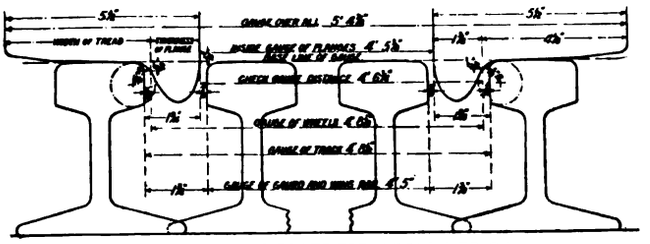
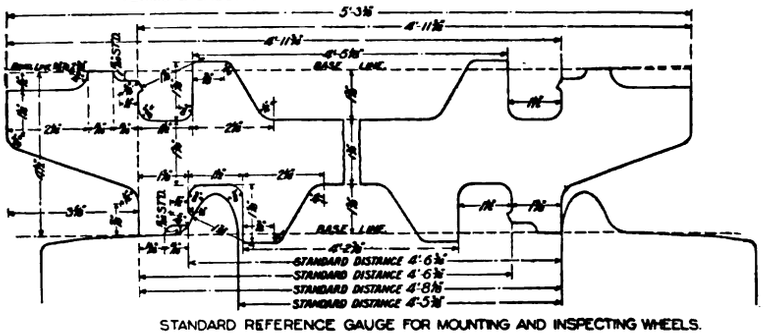
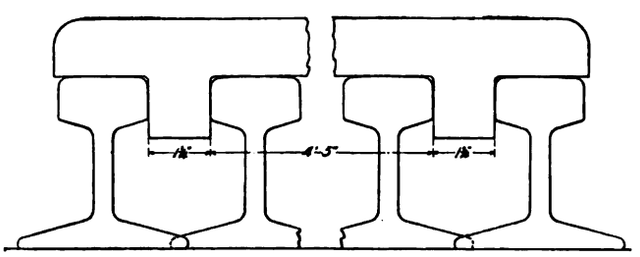


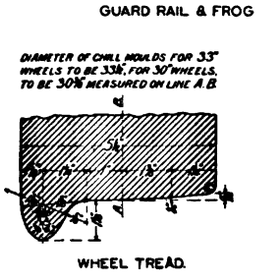
FIG. 4366. STANDARD WHEEL CHECK GAGE. SHEET 12.

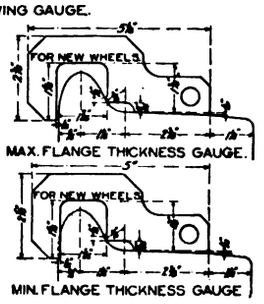


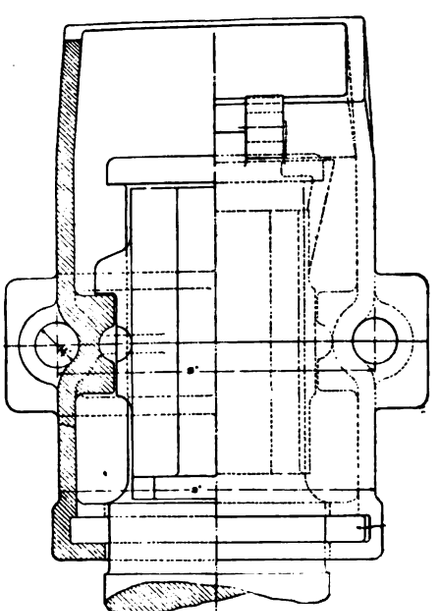


FIGS. 4367-4368. STANDARD TERMS AND GAGING POINTS FOR WHEELS AND TRACK. STANDARD REFERENCE GAGE FOR MOUNTING AND INSPECTING WHEELS. SHEET 12.

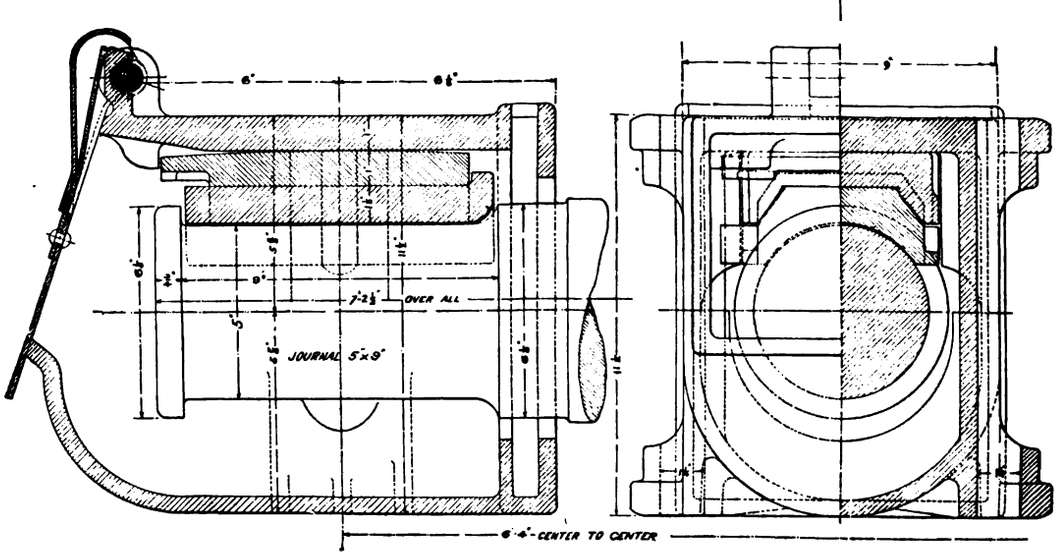




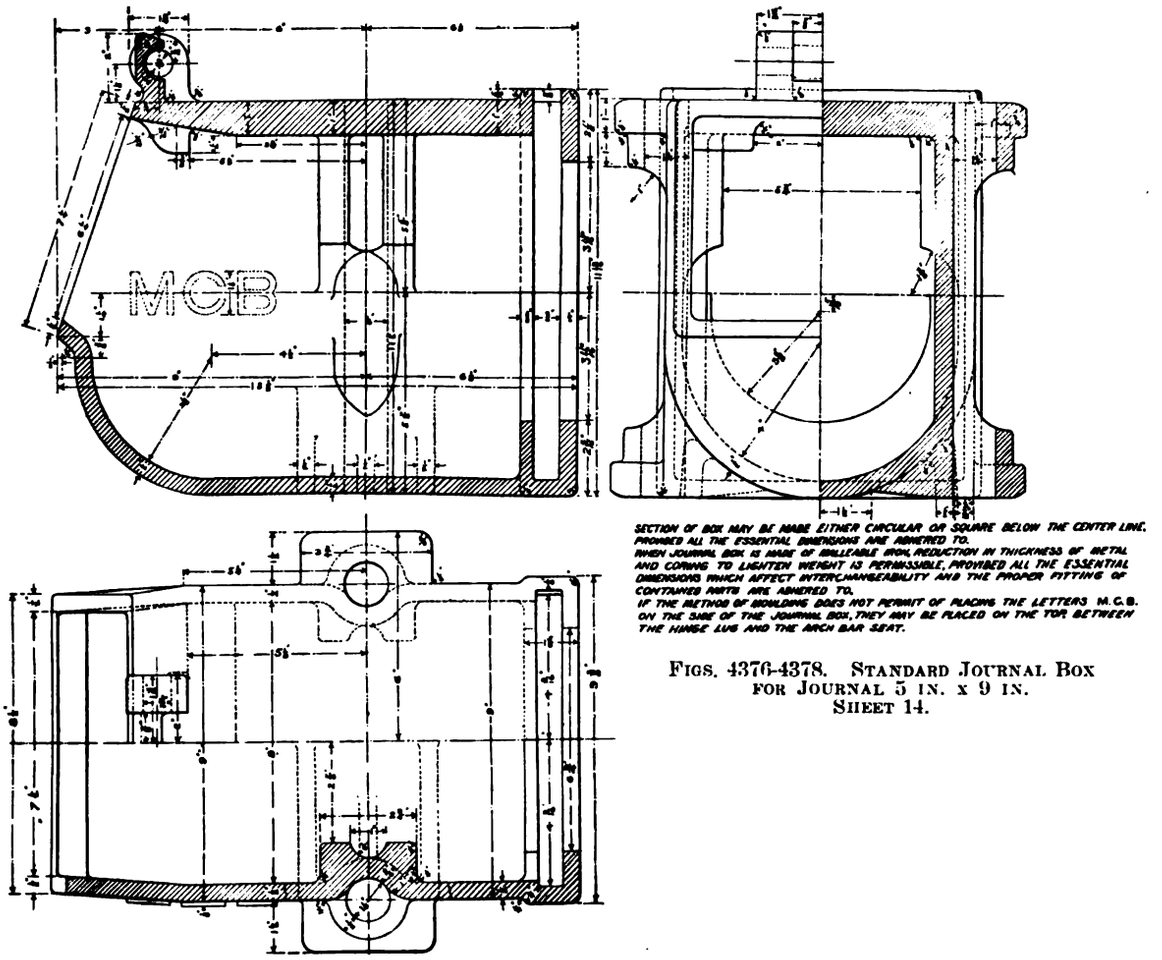




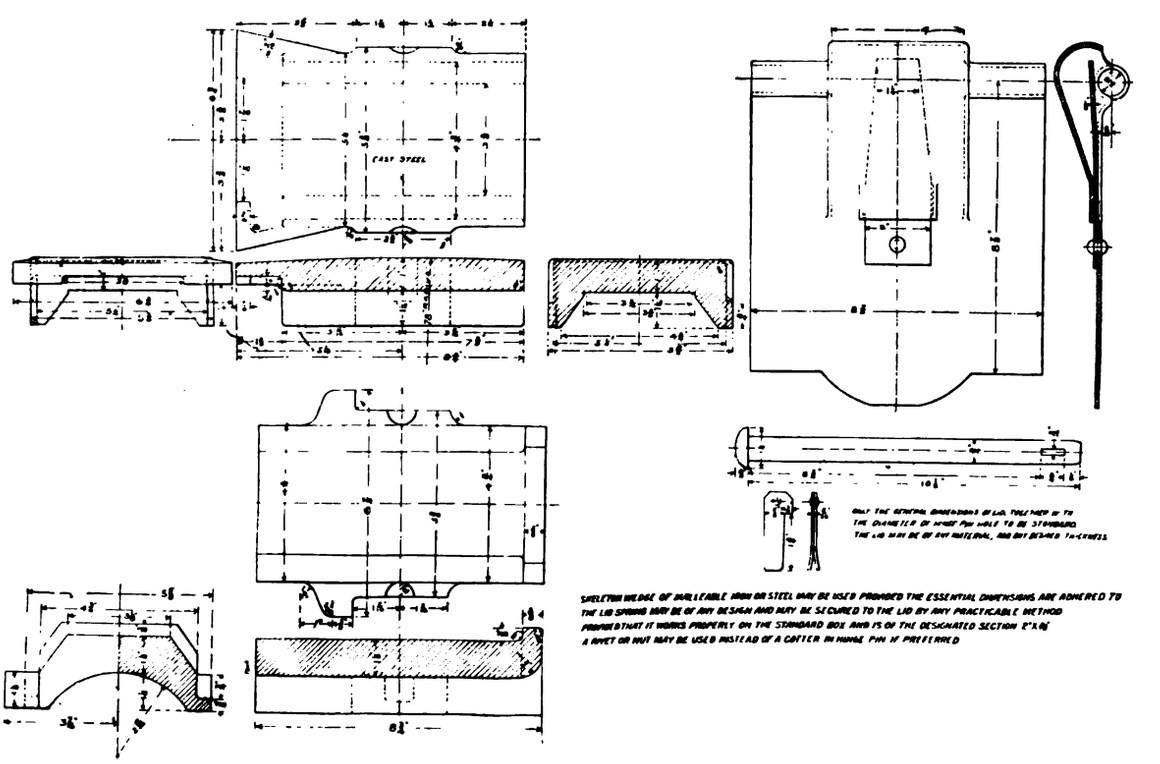
FIGS. 4369-4372. GUARD RAIL AND FROG WING GAGE. STANDARD WHEEL TREAD AND FLANGE GAGES. SHEET 12.


7'-2½" OVER ALL
JOURNAL 5"x9"
6'-4"-CENTER TO CENTER
SECTION OF BOX MAY BE MADE EITHER CIRCULAR OR SQUARE BELOW THE CENTER LINE, PROVIDED ALL THE ESSENTIAL DIMENSIONS ARE ADHERED TO
ANY SUITABLE DUST GUARD MAY BE USED.

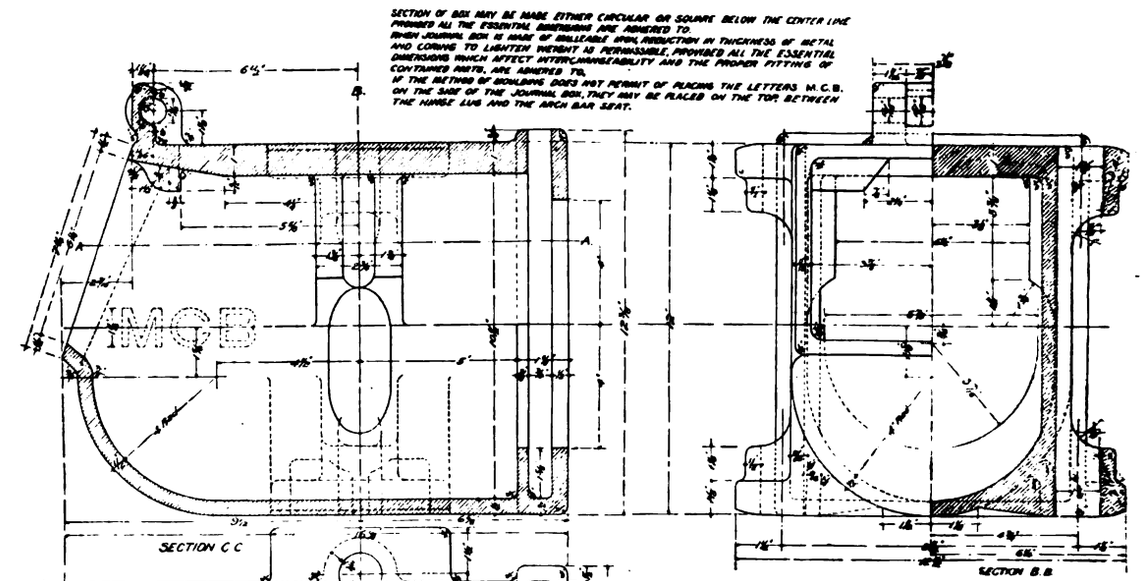
FIGS. 4373-4375. STANDARD JOURNAL BOX AND CONTAINED PARTS FOR JOURNAL 5 IN. x 9 IN. SHEET 13.


MCB
SECTION OF BOX MAY BE MADE EITHER CIRCULAR OR SQUARE BELOW THE CENTER LINE, PROVIDED ALL THE ESSENTIAL DIMENSIONS ARE ADHERED TO.
WHEN JOURNAL BOX IS MADE OF MALLEABLE IRON, REDUCTION IN THICKNESS OF METAL AND CORING TO LIGHTEN WEIGHT IS PERMISSIBLE, PROVIDED ALL THE ESSENTIAL DIMENSIONS WHICH AFFECT INTERCHANGEABILITY AND THE PROPER FITTING OF CONTAINED PARTS ARE ADHERED TO.
IF THE METHOD OF MOULDING DOES NOT PERMIT OF PLACING THE LETTERS M.C.B. ON THE SIDE OF THE JOURNAL BOX, THEY MAY BE PLACED ON THE TOP BETWEEN THE HINGE LUG AND THE ARCH BAR SEAT.

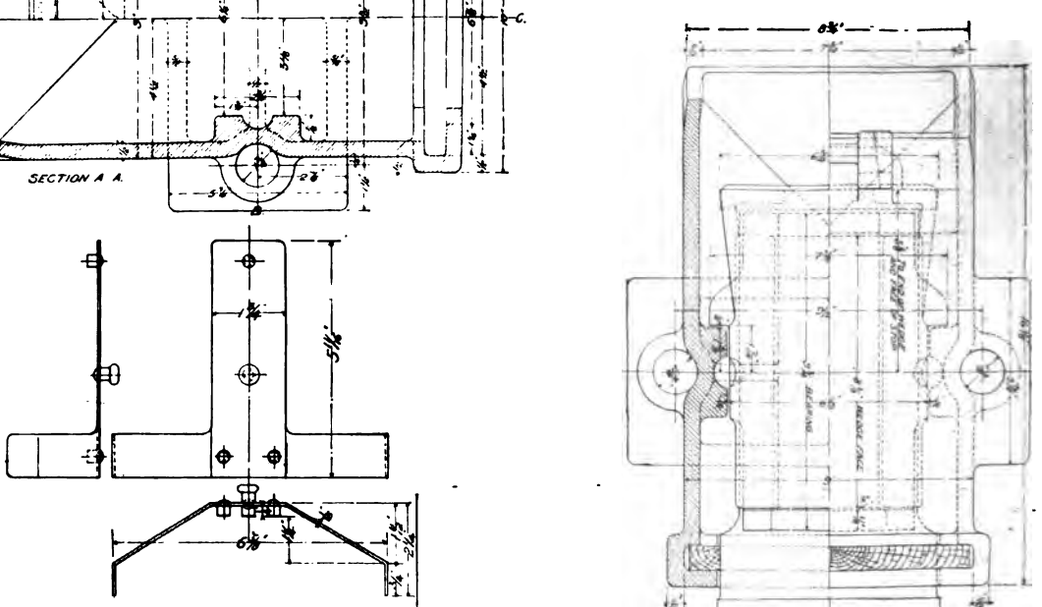
FIGS. 4376-4378. STANDARD JOURNAL BOX FOR JOURNAL 5 IN. X 9 IN. SHEET 14.


CAST STEEL
SKELETON WEDGE OF MALLEABLE IRON OR STEEL MAY BE USED PROVIDED THE ESSENTIAL DIMENSIONS ARE ADHERED TO
THE LID SPRING MAY BE OF ANY DESIGN AND MAY BE SECURED TO THE LID BY ANY PRACTICABLE METHOD PROVIDED THAT IT WORKS PROPERLY ON THE STANDARD BOX AND IS OF THE DESIGNATED SECTION
A RIVET OR NUT MAY BE USED INSTEAD OF A COTTER IN HINGE PIN IF PREFERRED

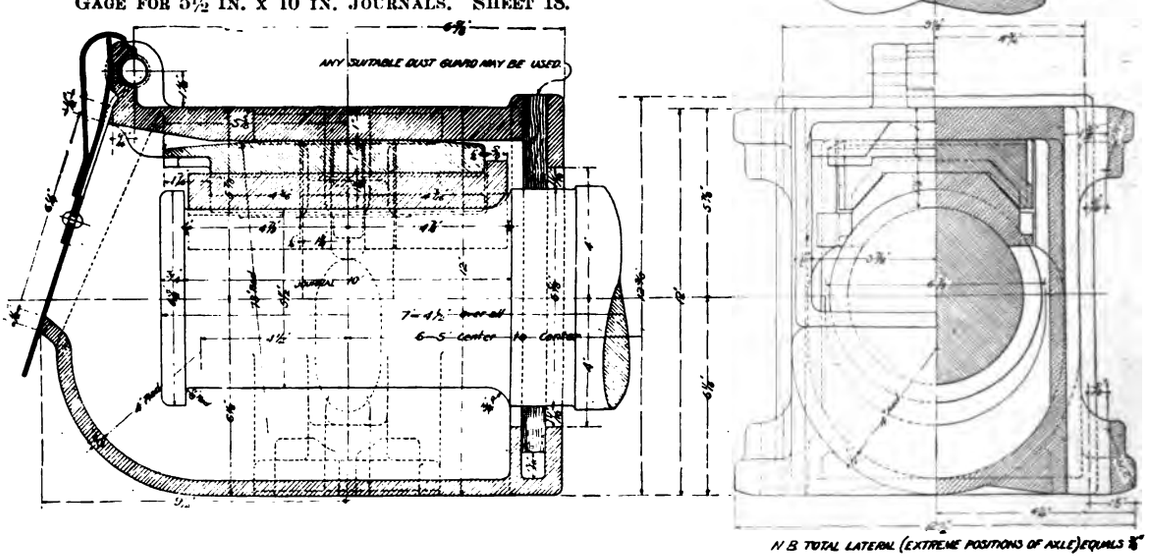
FIGS. 4379-4390. STANDARD BEARING, WEDGE AND LID FOR JOURNAL 5 IN. X 9 IN. SHEET 15.


SECTION OF BOX MAY BE MADE EITHER CIRCULAR OR SQUARE BELOW THE CENTER LINE PROVIDED ALL THE ESSENTIAL DIMENSIONS ARE ADHERED TO.
WHEN JOURNAL BOX IS MADE OF MALLEABLE IRON, REDUCTION IN THICKNESS OF METAL AND CORING TO LIGHTEN WEIGHT AS PRACTICABLE, PROVIDED ALL THE ESSENTIAL DIMENSIONS WHICH AFFECT INTERCHANGEABILITY AND THE PROPER FITTING OF CONTAINED PARTS, ARE ADHERED TO.
IF THE METHOD OF MOULDING DOES NOT PERMIT OF PLACING THE LETTERS M.C.B. ON THE SIDE OF THE JOURNAL BOX, THEY MAY BE PLACED ON THE TOP, BETWEEN THE HANGE LUG AND THE ARCH BAR SEAT.
M.C.B.
SECTION C C
SECTION A A
SECTION B B

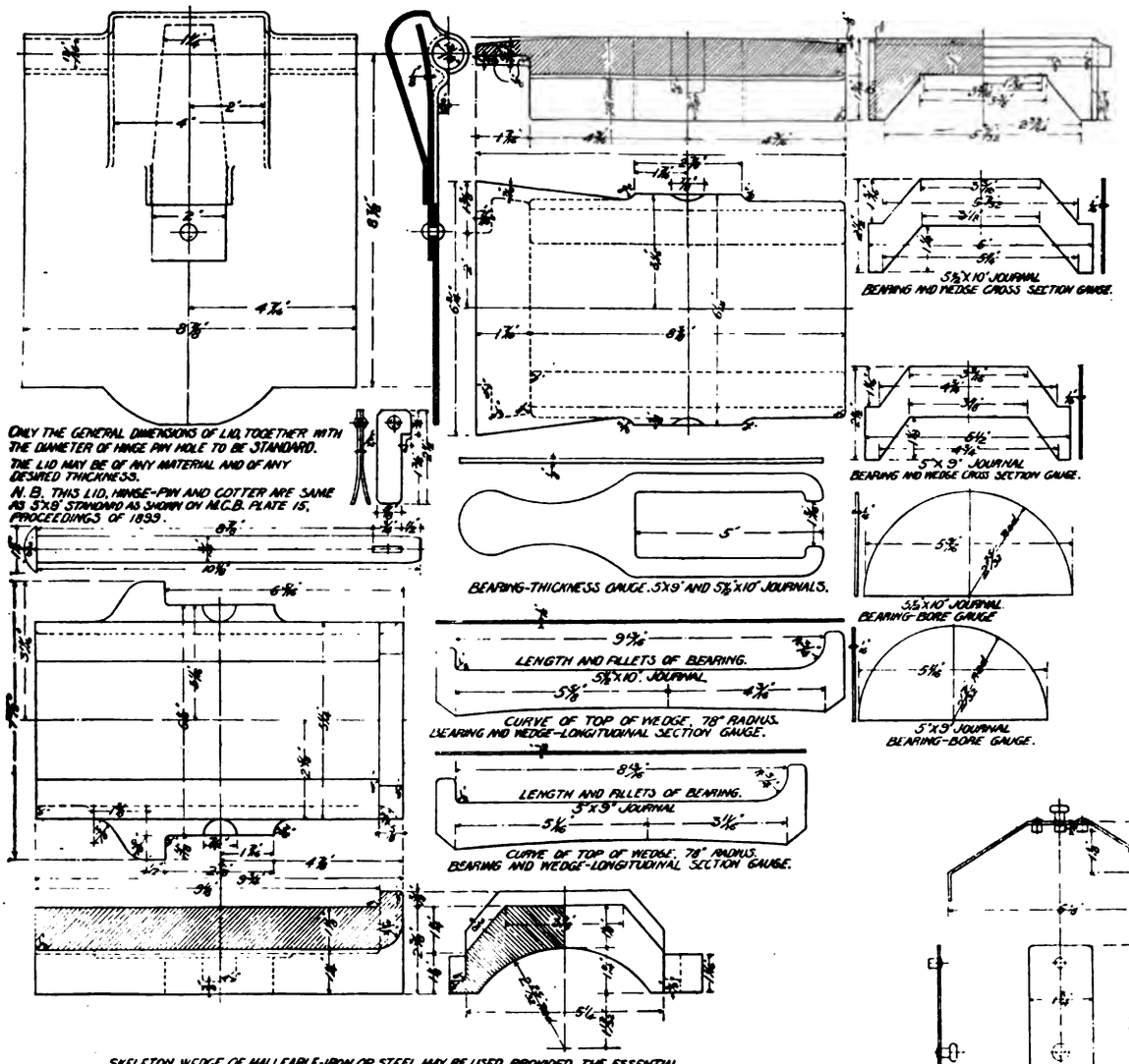
FIGS. 4391-4393. STANDARD JOURNAL BOX FOR JOURNAL 5½ x 10 IN. SHEET 17.



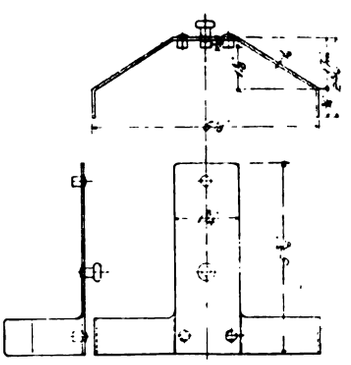
FIGS. 4394-4396. BEARING FLANGE AND SIDE LUG GAGE FOR 5½ IN. x 10 IN. JOURNALS. SHEET 18.



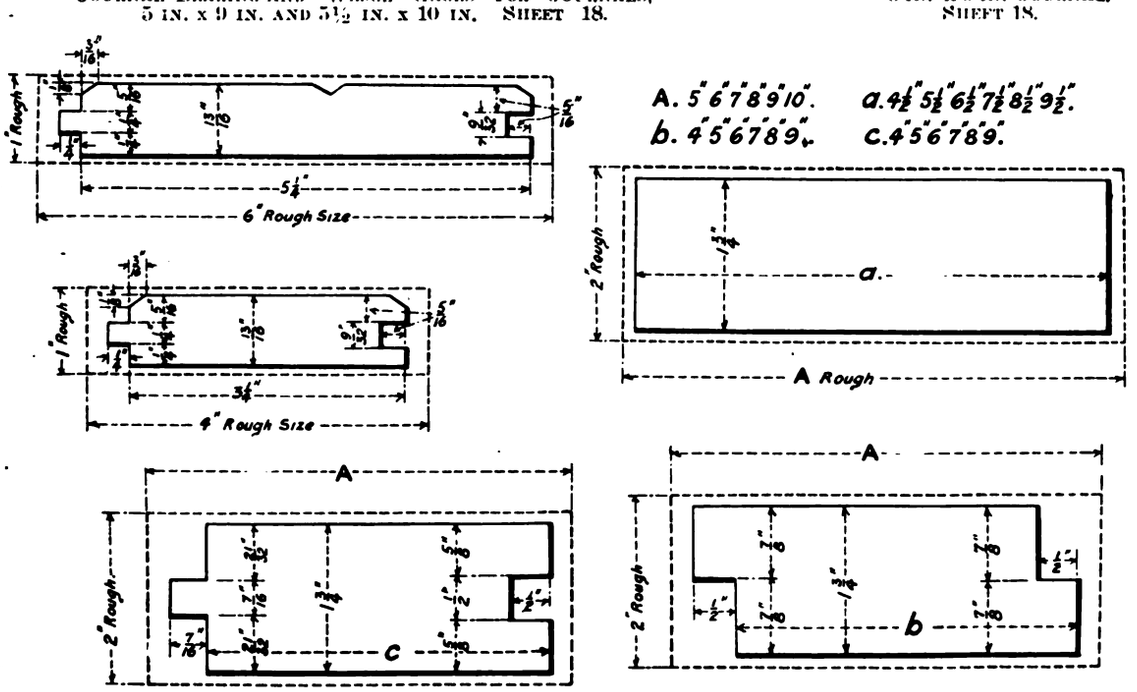
FIGS. 4397-4399. STANDARD JOURNAL BOX AND CONTAINED PARTS FOR JOURNAL 5½ IN. x 10 IN., ARRANGED TO TAKE STANDARD LID AS USED ON M. C. B. BOX FOR 5 IN. x 9 IN. JOURNAL. SHEET 16.


ONLY THE GENERAL DIMENSIONS OF LID, TOGETHER WITH THE DIAMETER OF HINGE PIN HOLE TO BE STANDARD.
THE LID MAY BE OF ANY MATERIAL AND OF ANY DESIRED THICKNESS.
N. B. THIS LID, HINGE-PIN AND COTTER ARE SAME AS 5"X9" STANDARD AS SHOWN ON M.C.B. PLATE 15, PROCEEDINGS OF 1899.
BEARING-THICKNESS GAUGE. 5"X9" AND 5½"X10" JOURNALS.
LENGTH AND FILLETS OF BEARING. 5½"X10" JOURNAL.
CURVE OF TOP OF WEDGE, 78" RADIUS. BEARING AND WEDGE-LONGITUDINAL SECTION GAUGE.
LENGTH AND FILLETS OF BEARING. 5"X9" JOURNAL.
CURVE OF TOP OF WEDGE, 78" RADIUS. BEARING AND WEDGE-LONGITUDINAL SECTION GAUGE.
5½"X10" JOURNAL BEARING AND WEDGE CROSS SECTION GAUGE.
5"X9" JOURNAL BEARING AND WEDGE CROSS SECTION GAUGE.
5½"X10" JOURNAL BEARING-BORE GAUGE.
5"X9" JOURNAL BEARING-BORE GAUGE.
SKELETON WEDGE OF MALLEABLE-IRON OR STEEL MAY BE USED PROVIDED THE ESSENTIAL DIMENSIONS ARE ADHERED TO.
THE LID SPRING MAY BE OF ANY DESIGN AND MAY BE SECURED TO THE LID BY ANY PRACTICABLE METHOD PROVIDED THAT IT WORKS PROPERLY ON THE STANDARD BOX AND IS OF THE DESIGNATED SECTION 2 x ⅛".
A RIVET OR NUT MAY BE USED INSTEAD OF A COTTER IN HINGE PIN IF PREFERED.

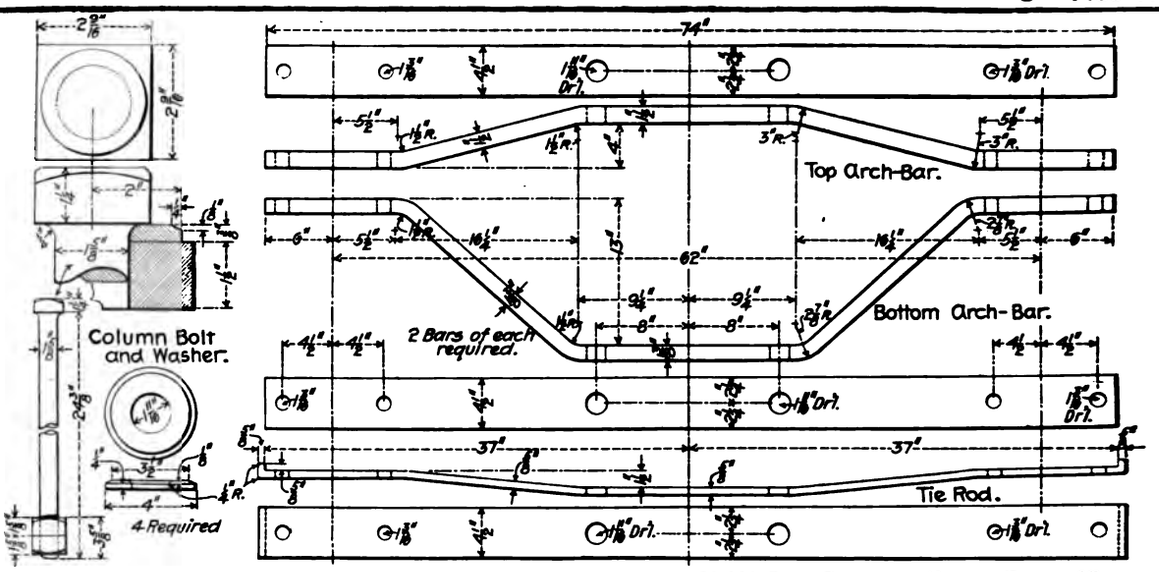
FIGS. 4400-4424. JOURNAL BEARING WEDGE AND LID FOR JOURNAL 5½ IN. X 10 IN. JOURNAL BEARING AND WEDGE GAGES FOR JOURNALS, 5 IN. X 9 IN. AND 5½ IN. X 10 IN. SHEET 18.



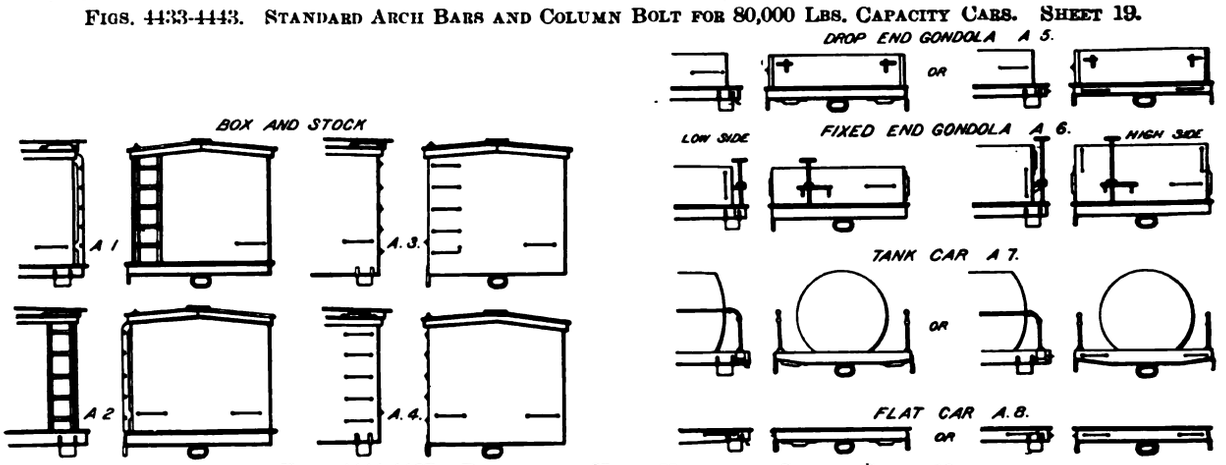
FIGS. 4425-4427. BEARING FLANGE AND SIDE LUG GAGE FOR 5 IN. X 9 IN. JOURNAL. SHEET 18.



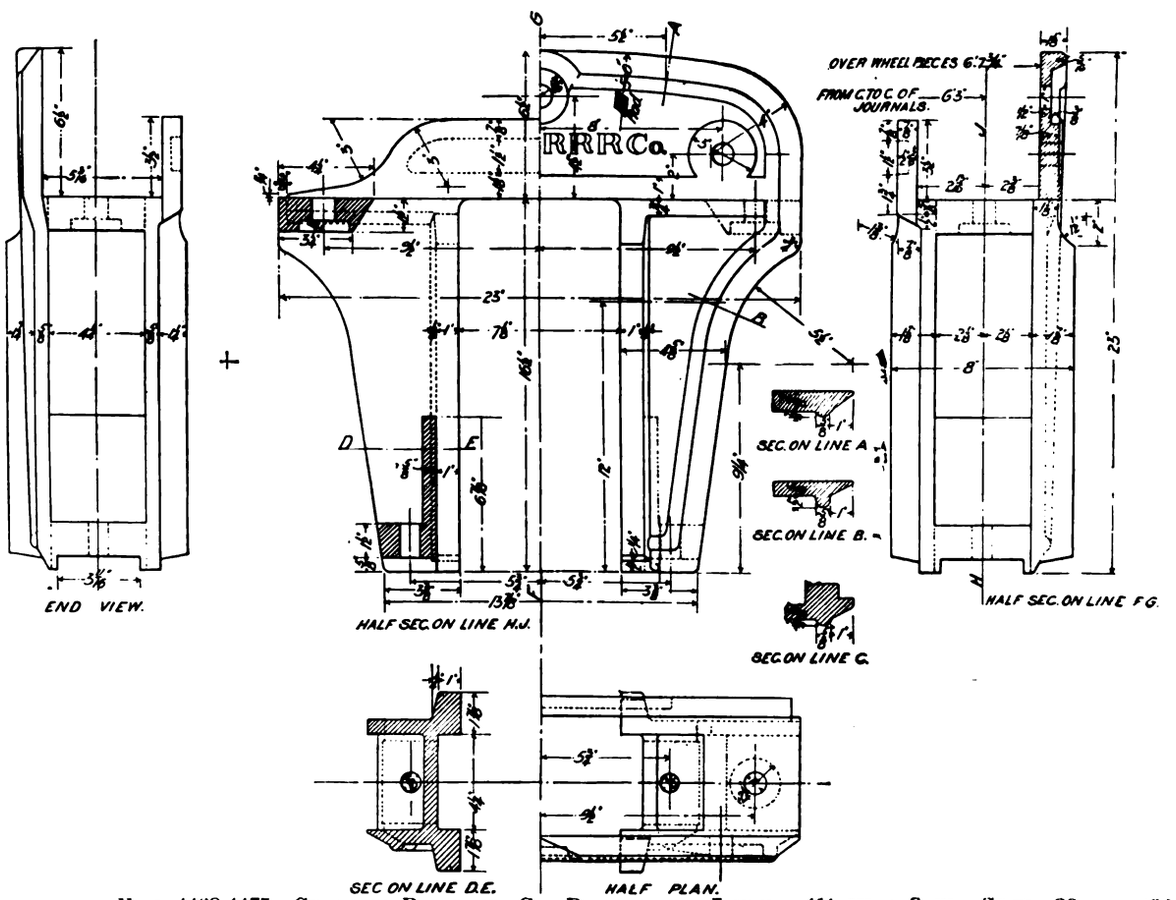
FIGS. 4428-4432. STANDARD ROOFING, FLOORING AND SIDING. SHEET 19.



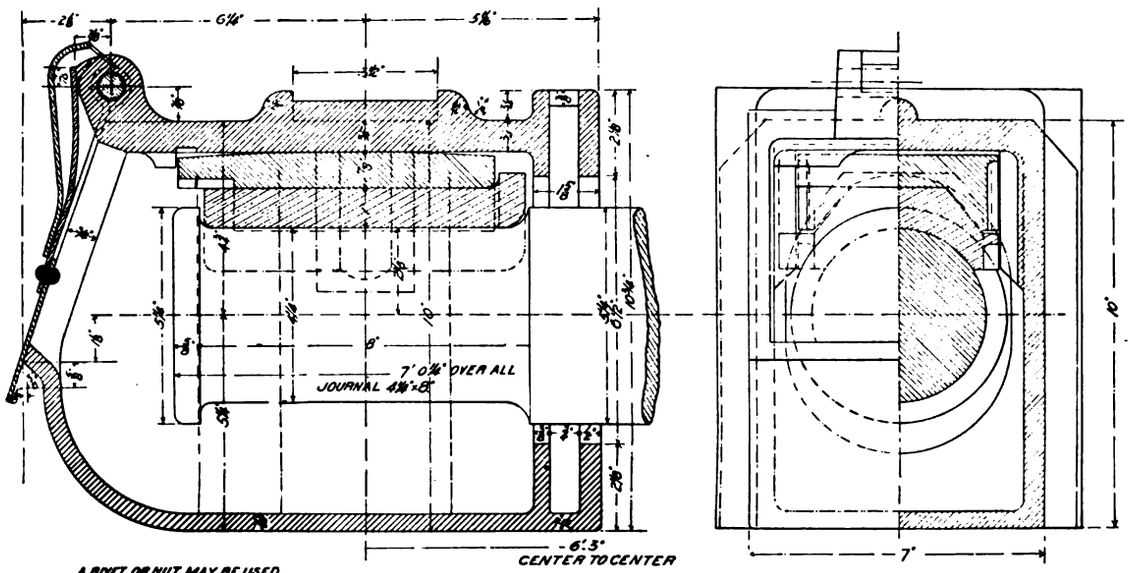
FIGS. 4433-4443. STANDARD ARCH BARS AND COLUMN BOLT FOR 80,000 LBS. CAPACITY CARS. SHEET 19.

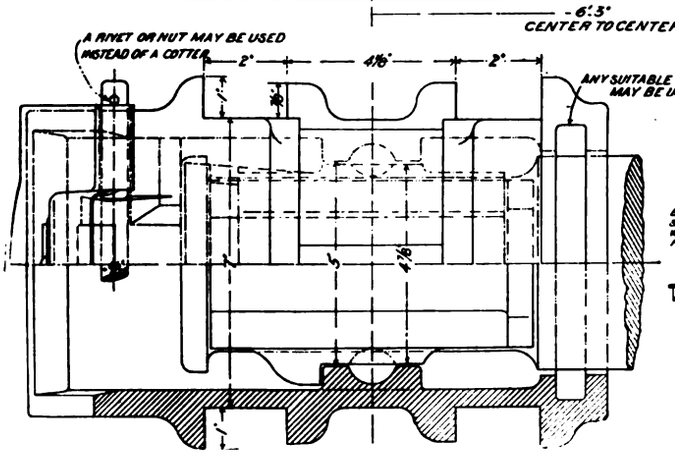


FIGS. 4444-4467. POSITION OF HAND HOLDS AND STEPS. SHEET 19.

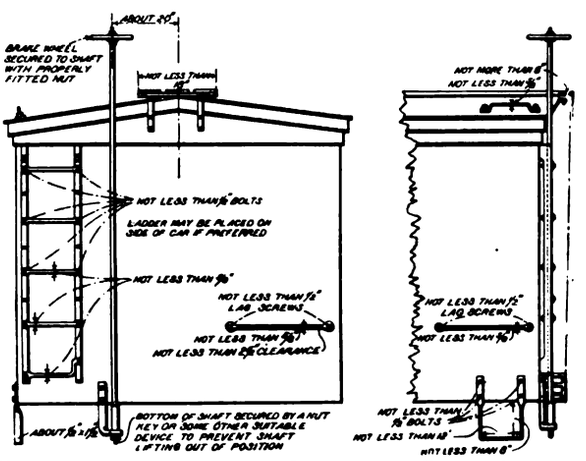


FIGS. 4468-4475. STANDARD PASSENGER CAR PEDESTAL FOR JOURNAL 4¼ IN. x 8 IN. SHEET 20. (328)

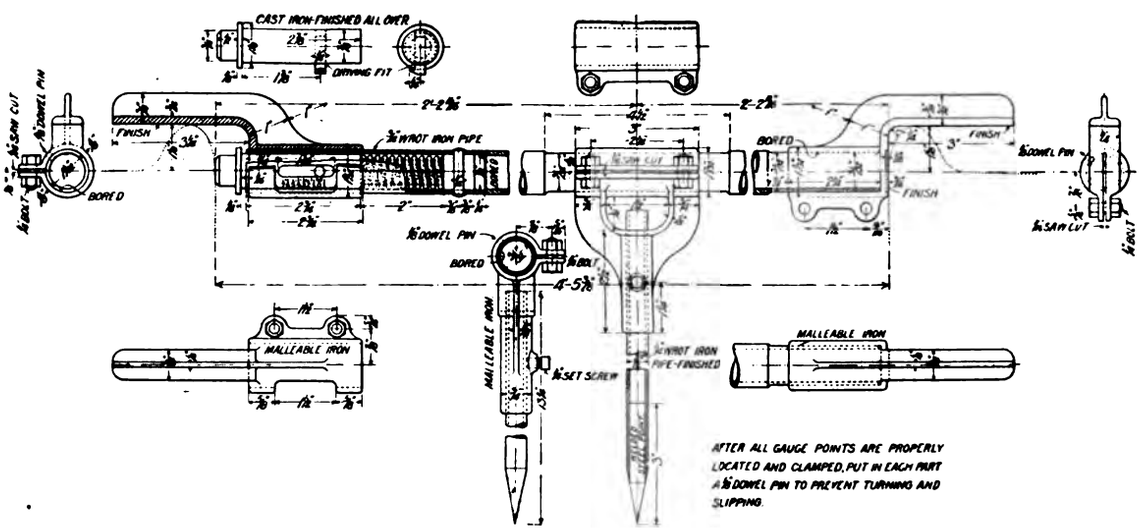




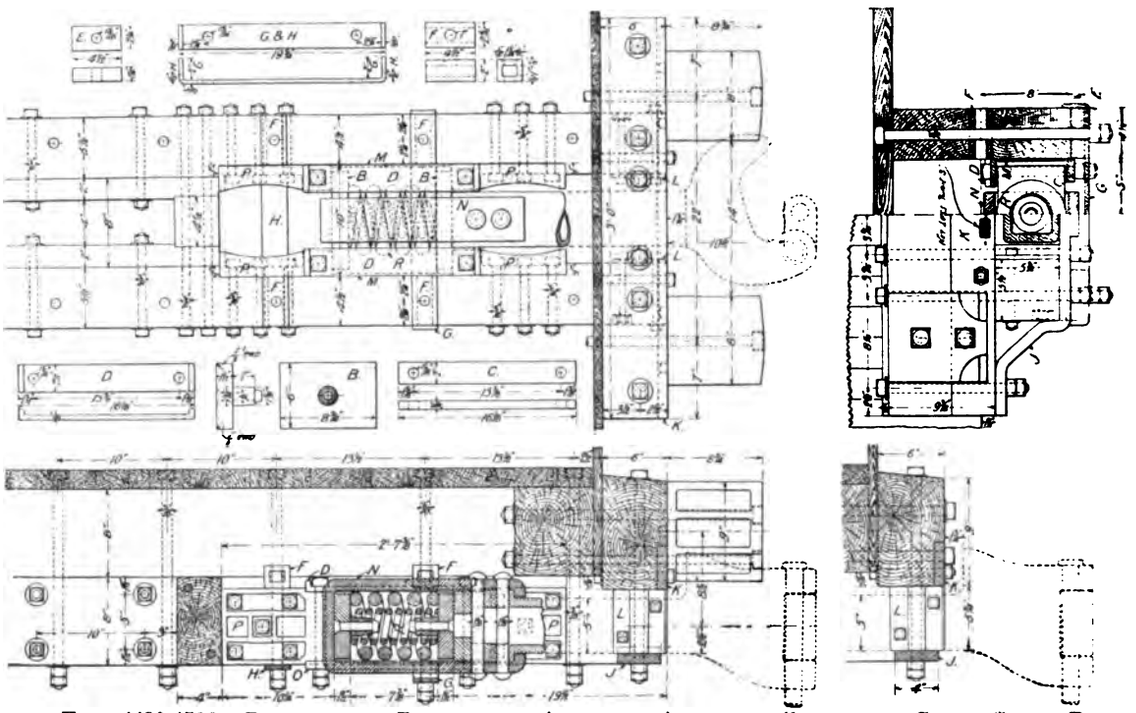
FIGS. 4476-4478. STANDARD JOURNAL BOX AND CONTAINED PARTS FOR JOURNAL 4¼ IN. X 8 IN. FOR PASSENGER CARS. SHEET 21.


BRAKE WHEEL SECURED TO SHAFT WITH PROPERLY FITTED NUT
NOT LESS THAN 16"
NOT LESS THAN ⅝" BOLTS
LADDER MAY BE PLACED ON SIDE OF CAR IF PREFERRED
NOT LESS THAN ⅝"
NOT LESS THAN ½" LAG SCREWS
NOT LESS THAN ⅝"
NOT LESS THAN 2½" CLEARANCE
BOTTOM OF SHAFT SECURED BY A NUT KEY OR SOME OTHER SUITABLE DEVICE TO PREVENT SHAFT LIFTING OUT OF POSITION
NOT MORE THAN 6"
NOT LESS THAN ⅝"
NOT LESS THAN ½" LAG SCREWS
NOT LESS THAN ⅝"
NOT LESS THAN ⅝" BOLTS
NOT LESS THAN 16"
NOT LESS THAN 6"

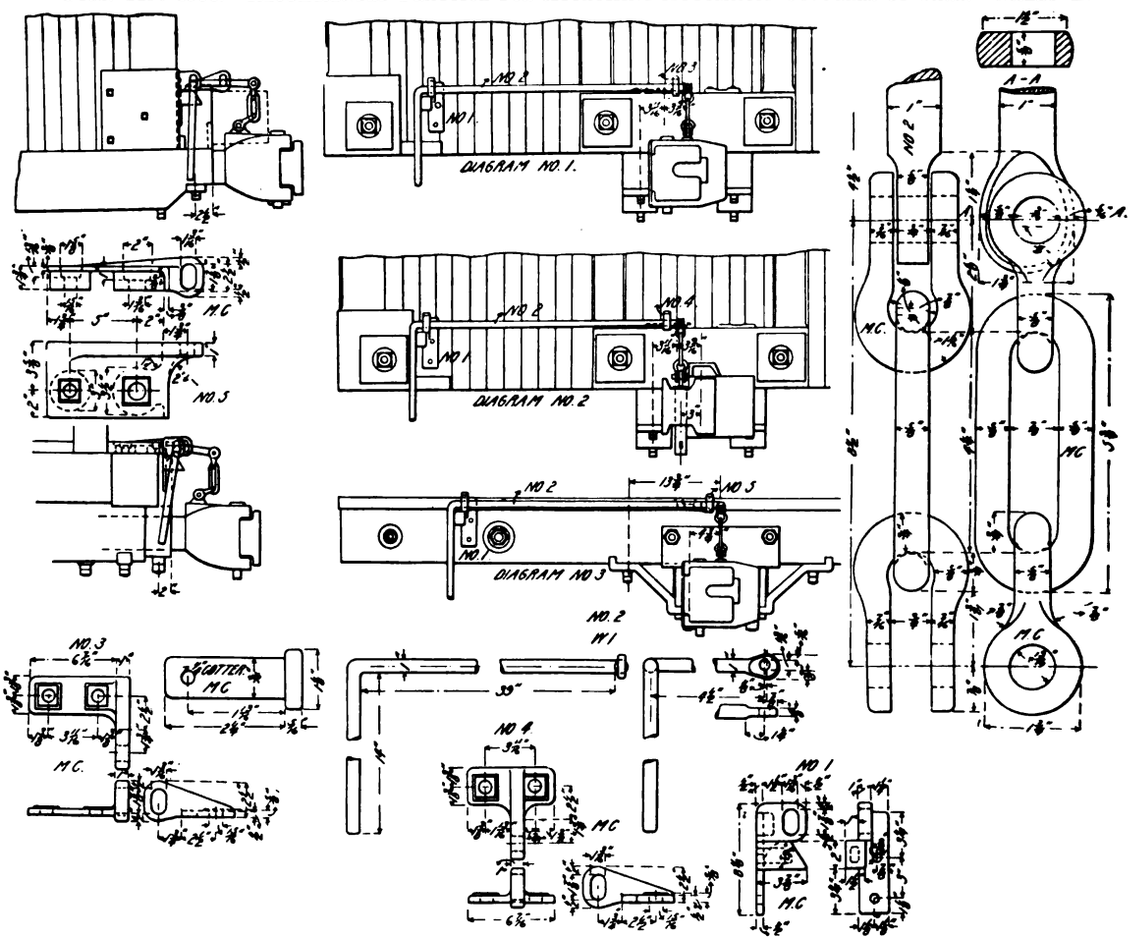
FIGS. 4479-4480. STANDARD POSITION OF BRAKE SHAFT STEP, LADDER AND RUNNING BOARD. SHEET 19.



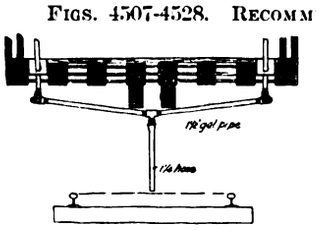
FIGS. 4481-4489. STANDARD GAGE FOR LOCATING WHEELS EQUIDISTANT FROM CENTER OF AXLE. SHEET 22.



FIGS. 4490-4506. RECOMMENDED PRACTICE FOR ATTACHING AUTOMATIC COUPLERS TO CARS. SHEET B.



FIGS. 4507-4528. RECOMMENDED PRACTICE FOR UNCOUPLING ATTACHMENTS. SHEET B.



FIGS. 4529-4530. RECOMMENDED PRACTICE FOR COLLECTION OF SALT WATER DRIPPINGS. SHEET A.

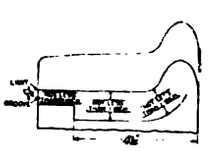
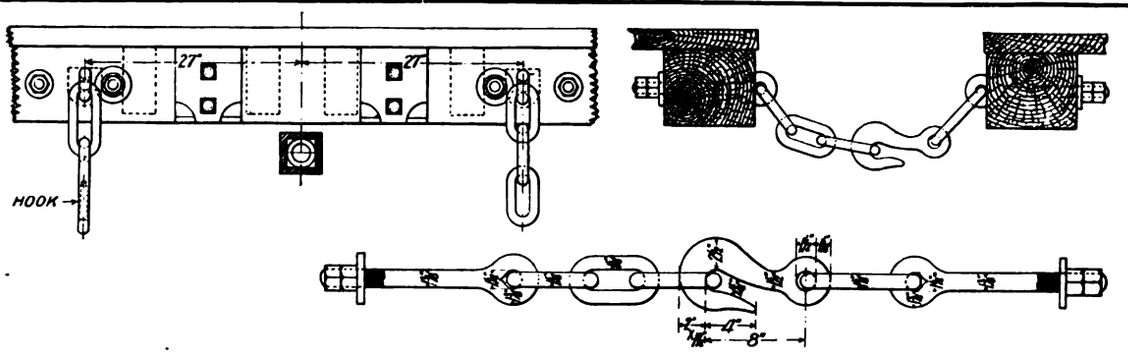
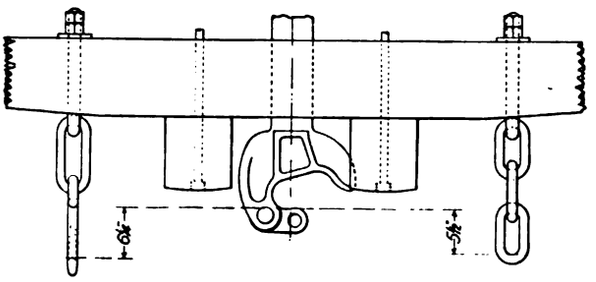
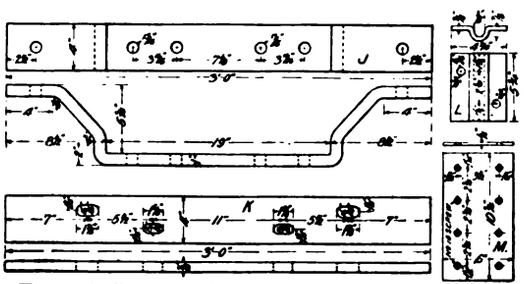


FIG. 4531. STEEL TIRE LIMIT FIGURE. SHEET C.

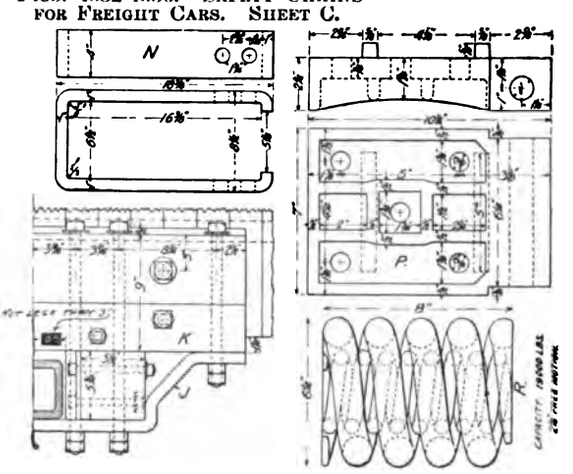


FIGS. 4532-4536. SAFETY CHAINS FOR FREIGHT CARS. SHEET C.

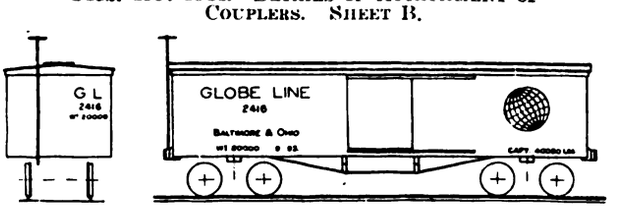




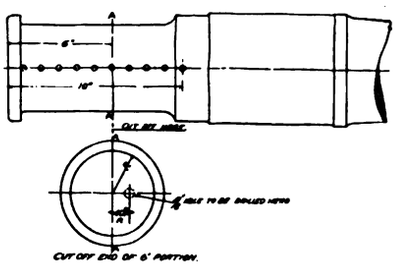
FIGS. 4537-4544. DETAILS OF ATTACHMENT OF COUPLERS. SHEET B.



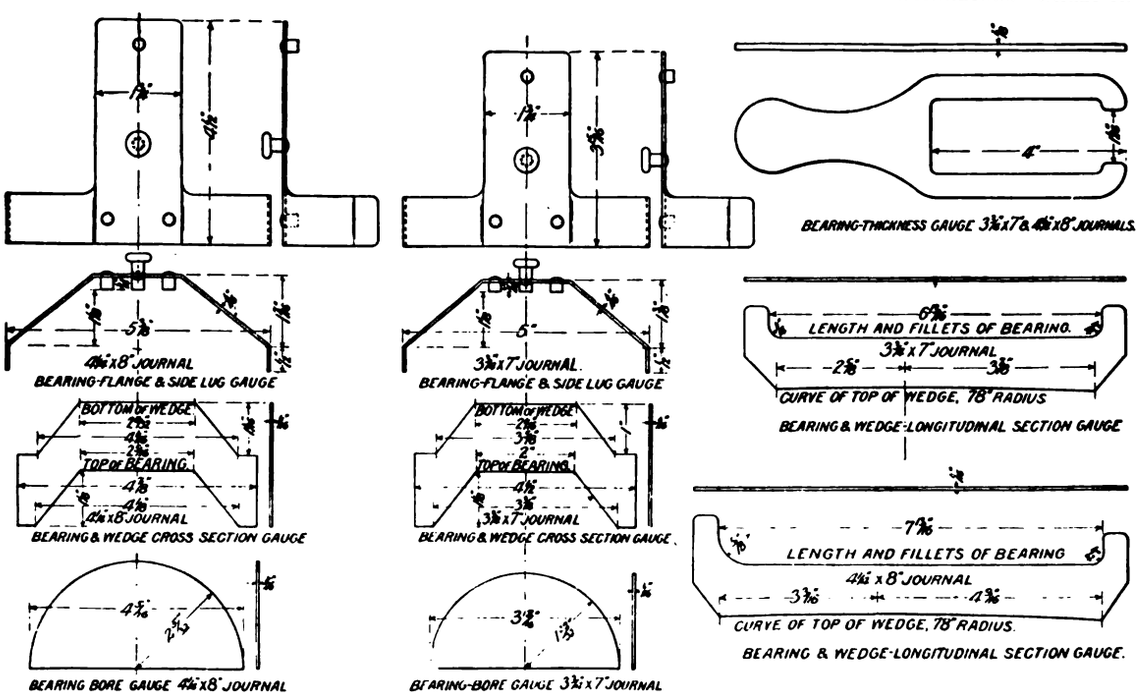
FIGS. 4545-4550. DETAILS OF ATTACHMENT OF COUPLERS. SHEET B.



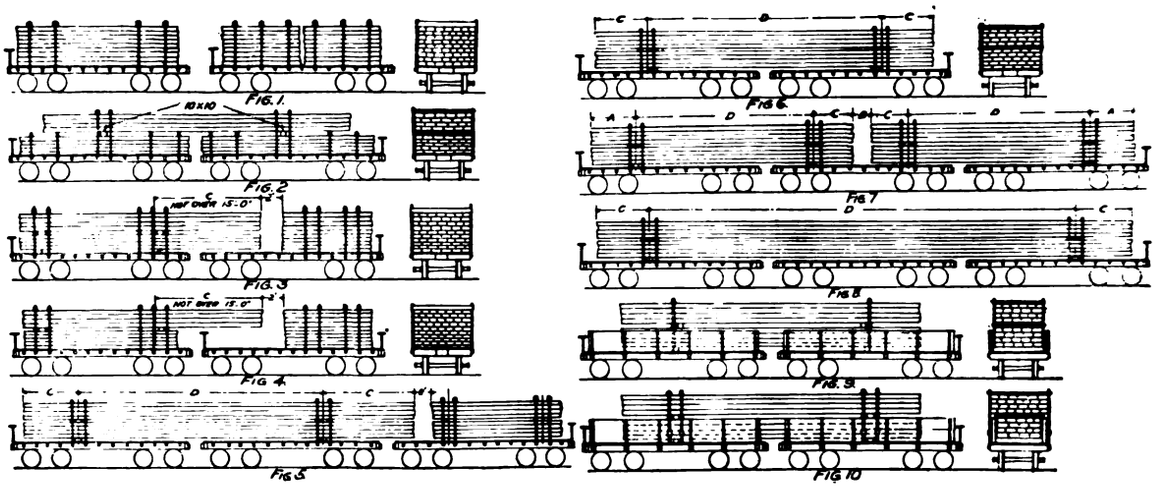
FIGS. 4551-4553. RECOMMENDED MARKING OF FAST FREIGHT LINE CARS. SHEET A.



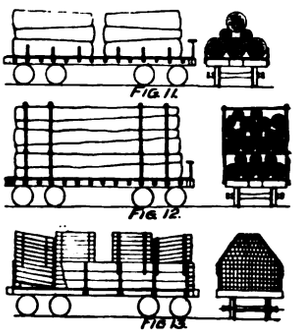
FIGS. 4554-4555. MANNER OF TAKING BORINGS OF AXLES FOR ANALYSIS. SHEET A.


BEARING-THICKNESS GAUGE 3¼"x7" & 4⅛"x8" JOURNALS.
4⅛"x8" JOURNAL
BEARING-FLANGE & SIDE LUG GAUGE
3¼"x7" JOURNAL
BEARING-FLANGE & SIDE LUG GAUGE
LENGTH AND FILLETS OF BEARING.
3¼"x7" JOURNAL
CURVE OF TOP OF WEDGE, 78" RADIUS
BEARING & WEDGE-LONGITUDINAL SECTION GAUGE
BOTTOM OF WEDGE
TOP OF BEARING
4⅛"x8" JOURNAL
BEARING & WEDGE CROSS SECTION GAUGE
3¼"x7" JOURNAL
BEARING & WEDGE CROSS SECTION GAUGE
LENGTH AND FILLETS OF BEARING
4⅛"x8" JOURNAL
CURVE OF TOP OF WEDGE, 78" RADIUS.
BEARING & WEDGE-LONGITUDINAL SECTION GAUGE.
BEARING BORE GAUGE 4⅛"x8" JOURNAL
BEARING-BORE GAUGE 3¼"x7" JOURNAL

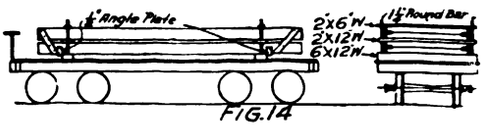
 FIGS. 4556-4575. RECOMMENDED PRACTICE FOR JOURNAL BEARING AND WEDGE GAGES. SHEET C.



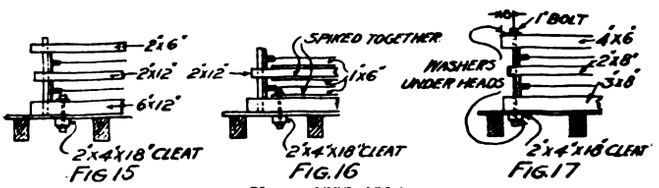
FIGS. 4576-4593. LOADING LUMBER ON OPEN CARS.



FIGS. 4594-4599.
LOADING LOGS, PILING TIES, ETC., ON OPEN CARS.



FIGS. 4600-4601.



FIGS. 4602-4604.

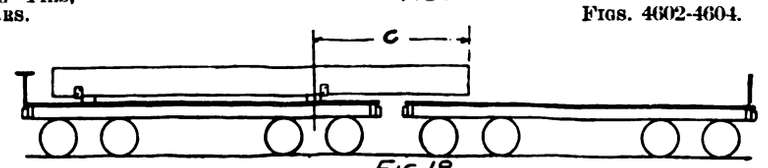
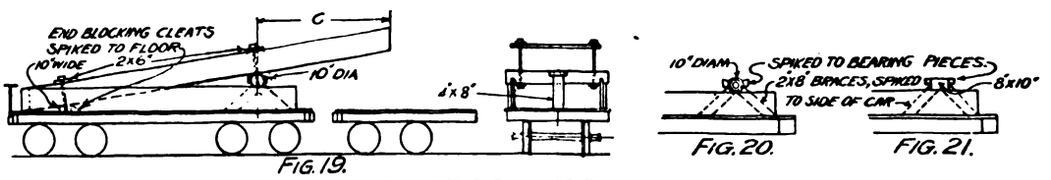


FIG. 4605.



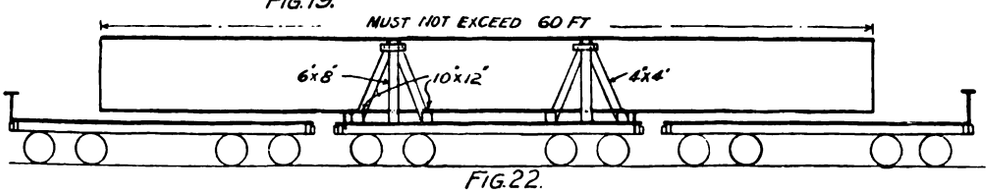
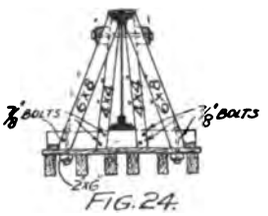
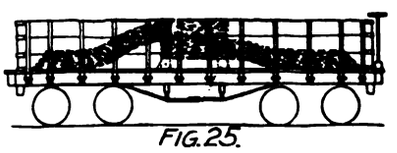
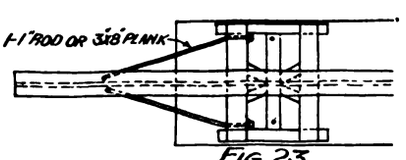


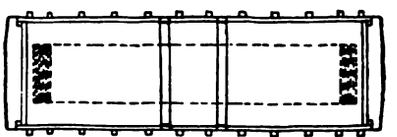
FIG. 4606-4611







FIGS. 4612-4613.



FIGS. 4614-4615.

FIGS. 4600-4615. LOADING LONG STRUCTURAL MATERIAL, PLATES, RAILS, GIRDERS, TURNTABLES, ETC., ON OPEN CARS. RECOMMENDED PRACTICE FOR LOADING LONG MATERIALS ON OPEN CARS. SHEET D. (332)

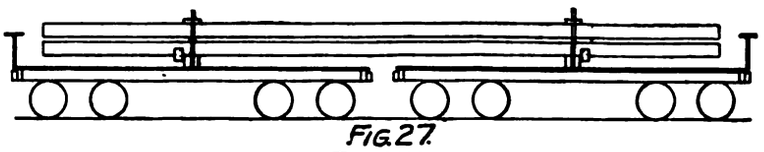


FIG. 27.

FIG. 4616.

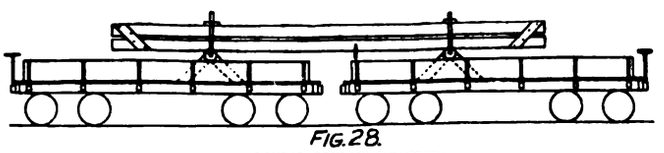


FIG. 28.

FIG. 29.

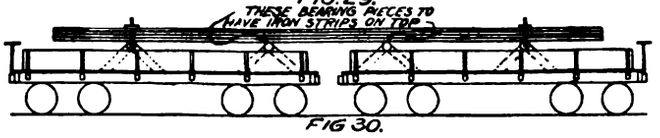


FIG 30.

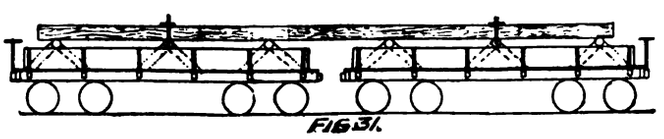


FIG 31.

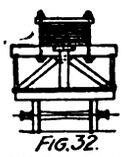


FIG. 32.
END ELEVATION OF
FIGS. 28, 30 AND 31

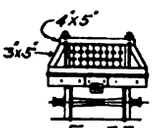


FIG. 33.
END ELEVATION OF
FIGS. 34, 35 AND 36.

FIGS. 4617-4622.

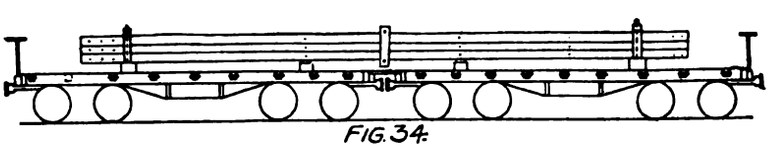


FIG. 34.

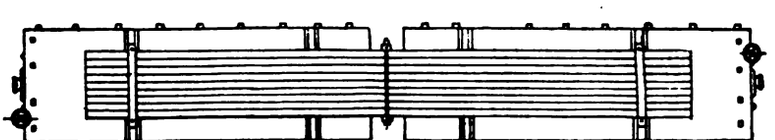


FIG. 35.
PLAN VIEW OF FIG. 34.

FIGS. 4623-4624.

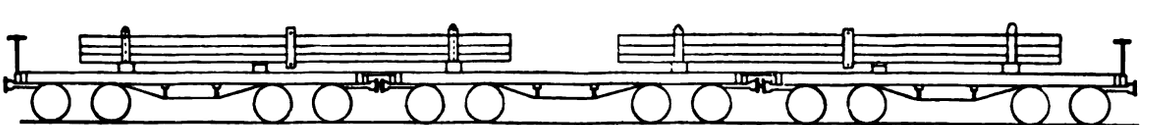


FIG. 36.

FIG. 4625.

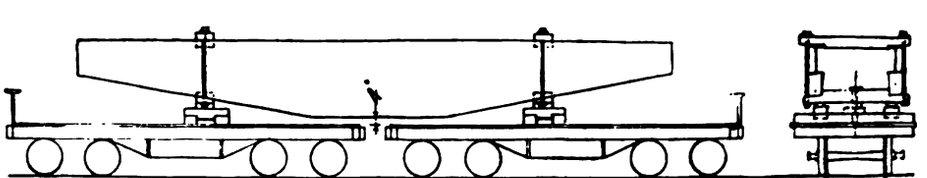


FIG. 39.

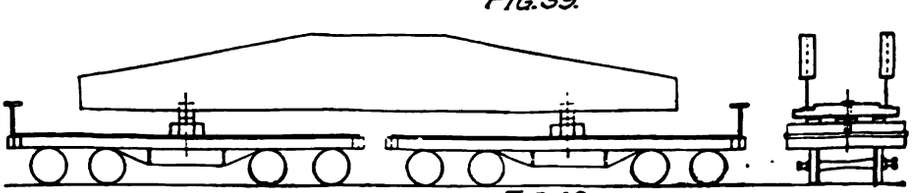


FIG. 40.

FIGS. 4626-4629.

FIGS. 4600-4629. LOADING LONG STRUCTURAL MATERIAL, PLATES, RAILS, GIRDERS, TURNTABLES, ETC., ON OPEN CARS.
(333) RECOMMENDED PRACTICE FOR LOADING LONG MATERIALS ON OPEN CARS. SHEET D.

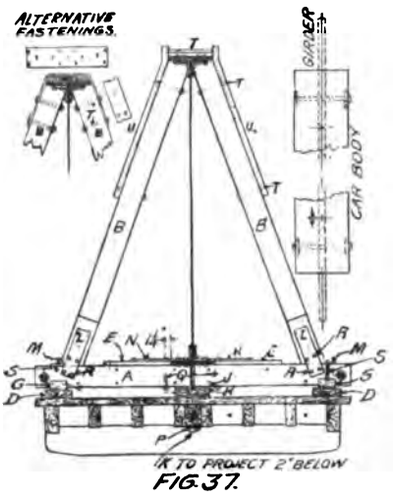


FIG. 37.

NOTE. CENTRE PLATES AND SIDE BEARINGS MUST BE WELL COATED WITH GREASE BEFORE THE LADING IS PLACED ON THEM.

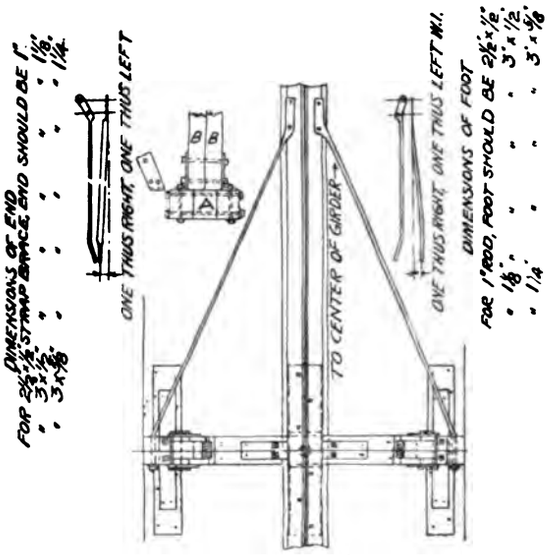

DIMENSIONS OF END
FOR 2½"x½" STIRRUP BRACE, END SHOULD BE 1"
" 3"x⅜" " " " " 1⅛"
" 3"x⅜" " " " " 1¼"
ONE THUS RIGHT, ONE THUS LEFT
TO CENTER OF GIRDER
ONE THUS RIGHT, ONE THUS LEFT
DIMENSIONS OF FOOT
FOR 1" ROD, FOOT SHOULD BE 2½"x½"
" ⅛" " " " " 3"x½"
" ¼" " " " " 3"x⅝"

FIG. 38.

FIGS. 4630-4641. LOADING LONG STRUCTURAL MATERIAL, PLATES, GIRDERS, ETC., ON OPEN CARS.

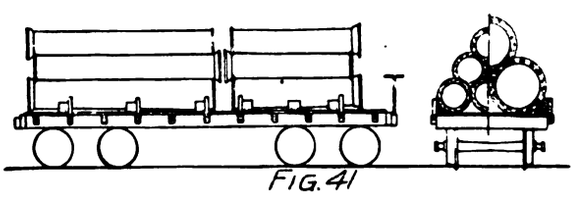


FIG. 41

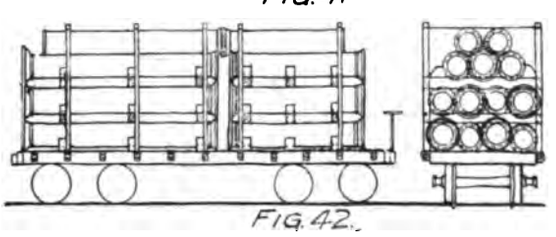


FIG. 42.

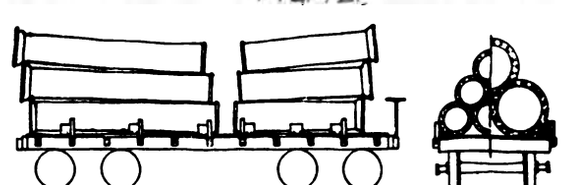
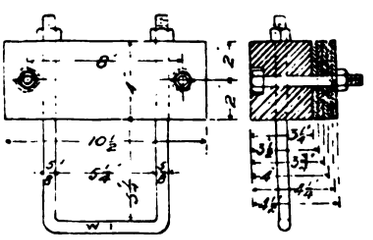
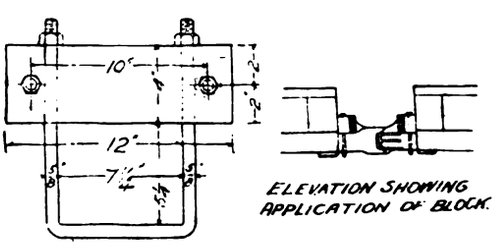


FIG. 43.

FIGS. 4642-4647. LOADING PIPE ON OPEN CARS.

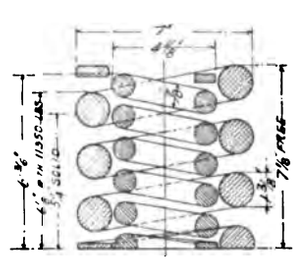




FIGS. 4648-4651.
DETAIL OF METHOD OF BLOCKING OUT COUPLERS ON TWO CARS CARRYING ONE LOAD.

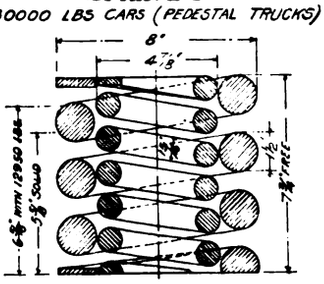
RECOMMENDED PRACTICE FOR LOADING LONG MATERIALS ON OPEN CARS. SHEET D.

SPRING "E"
60000 LBS. CARS (PEDESTAL TRUCKS)



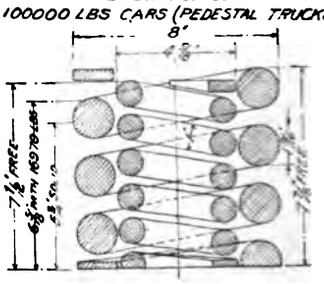
TWO BARS 1ST BAR 1⅝" DIA, 67½" LONG, TAPERED TO 7/8"
2ND " ⅞" " 61⅛" " " 44⅜"
NORMAUNT 1ST " 28 LBS. 8 OZ. MINIMUM WT 27 LBS. 10 OZ.
" 2ND " 10 " 8 " " 10 " 2 "
OUTSIDE DIAM. 1ST COIL 7" 2ND COIL 4⅜"
HEIGHTS, 1ST COIL 7⅛" FREE, 5⅛" SOLID 6⅝" 8270 LBS. CAPY. 15530 LBS.
2ND " 6¾" " 5⅜" " 4⅜" 3080 " " 7000
CLUSTER OF SPRINGS
HEIGHTS, 7⅛" FREE, 5⅜" SOLID, 6⅝" 11350 LBS. CAPY. 22530 LBS.

SPRING "F"
80000 LBS CARS (PEDESTAL TRUCKS)



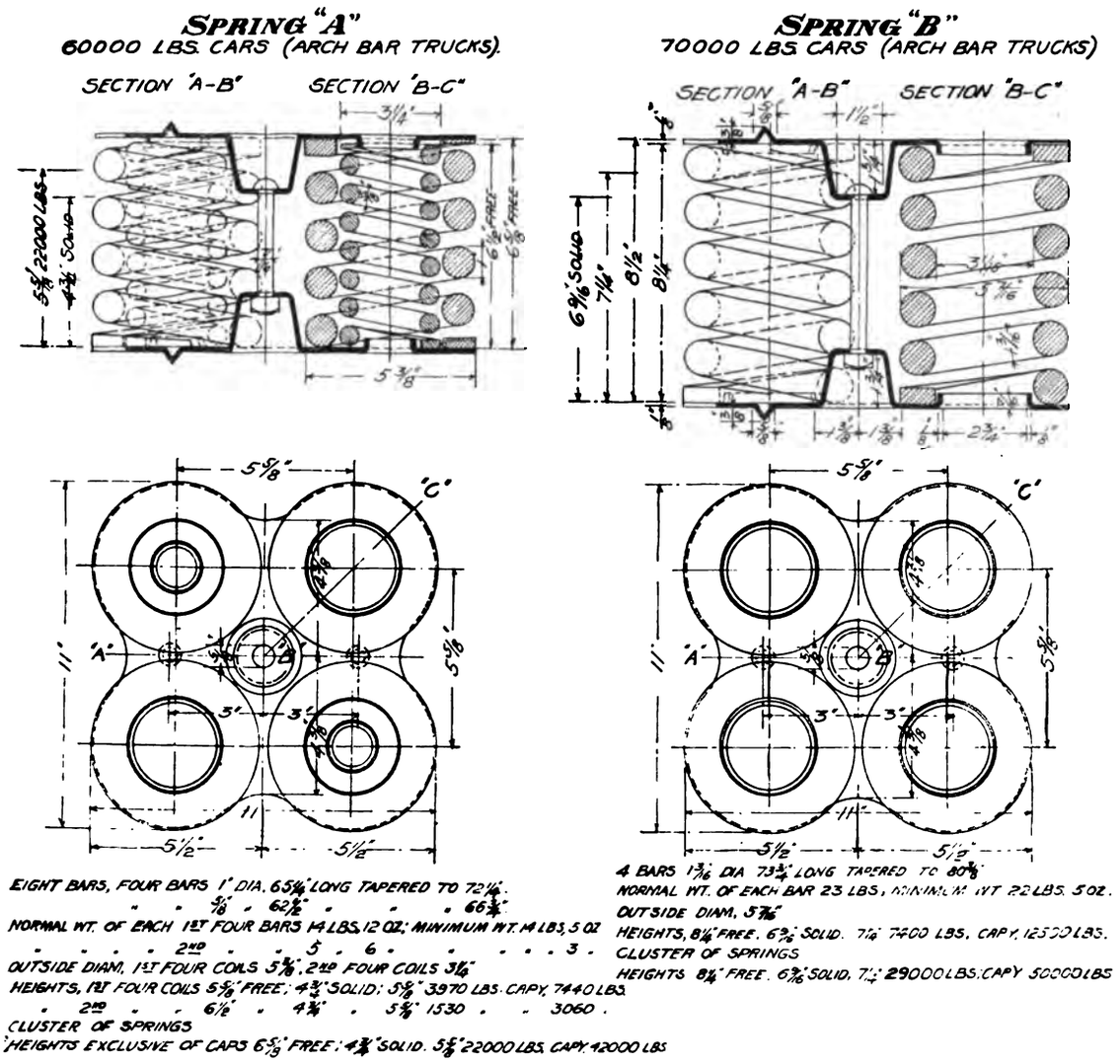
TWO BARS, 1ST BAR 1⅝" DIA, 76½" LONG, TAPERED TO 86⅝"
2ND " 1⅝" " 74" " " 80"
NORMAL WT 1ST " 38 LBS. 6 OZ MINIMUM WT 37 LBS. 9 OZ.
" 2ND " 14 " 6 " " 13 " 15 "
OUTSIDE DIAM. 1ST COIL 8", 2ND COIL 4⅞"
HEIGHTS, 1ST COIL 7½" FREE, 5¾" SOLID, 6⅝" 5200 LBS. CAPY 10400 LBS
2ND " 7⅜" " 5¾" " 6⅝" 3780 " " 7100 "
CLUSTER OF SPRINGS
HEIGHTS, 7⅛" FREE, 5⅜" SOLID, 6⅝" 12950 LBS, CAPY 26500 LBS.

SPRING "G"
100000 LBS CARS (PEDESTAL TRUCKS)

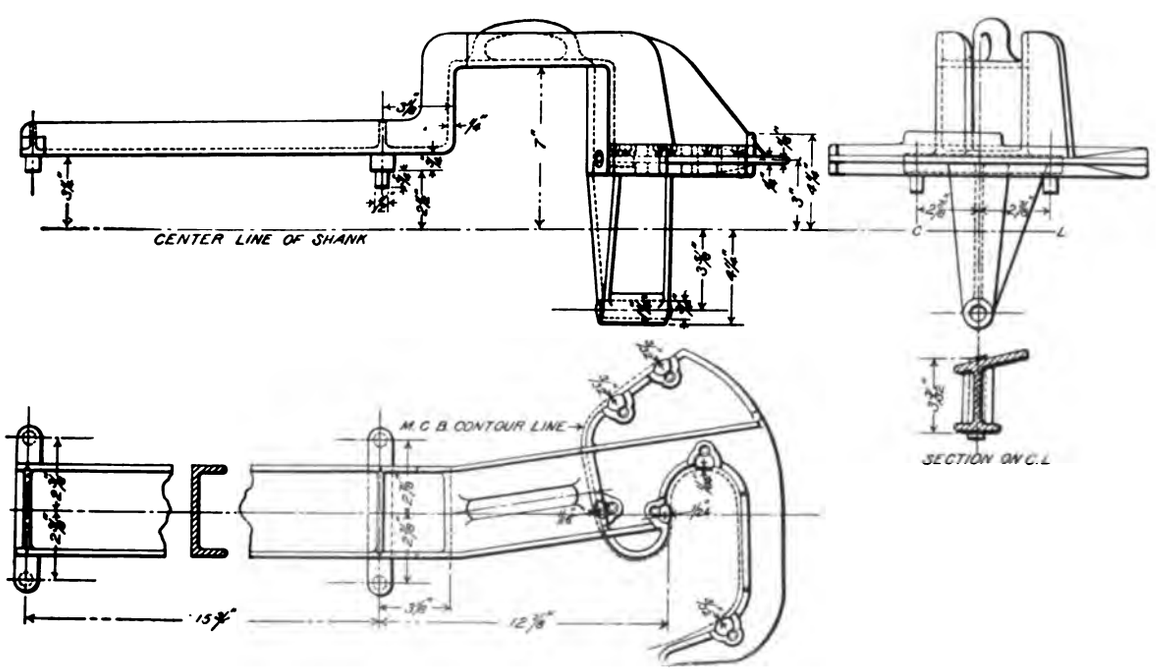


TWO BARS, 1ST BAR 1⅝" DIA 78⅜" LONG, TAPERED TO 86⅝"
2ND " 1" " 65½" " " 71⅜"
NORMAL WT 1ST " 40 LBS 5 OZ MINIMUM WT 39 LBS. 1⅞ OZ.
" 2ND " 14 " 8 " " 14 " 1 "
OUTSIDE DIAM 1ST COIL 8", 2ND COIL 4⅝"
HEIGHTS 1ST COIL 7⅞" FREE, 5⅜" SOLID 6⅝" 11940 LBS, CAPY 20300 LBS.
2ND " 7⅞" " 5⅜" " 6⅝" 5030 " " 10060 "
CLUSTER OF SPRINGS
HEIGHTS, 7⅞" FREE, 5⅜" SOLID, 6⅝" 16970 LBS CAPY 30360 LBS.

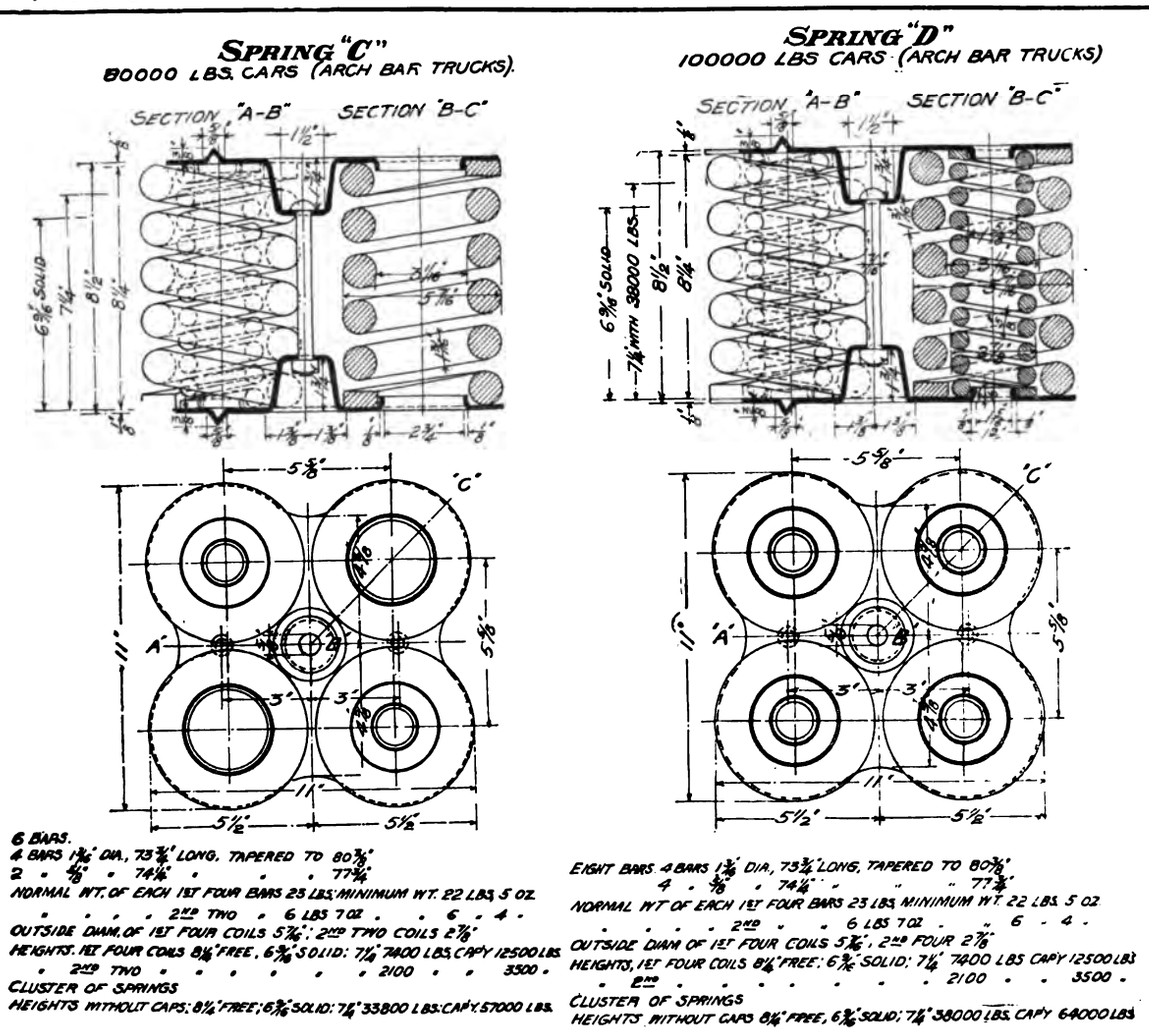
FIGS. 4652-4654. RECOMMENDED PRACTICE FOR SPRINGS FOR PEDESTAL TRUCKS. SHEET H.


SPRING "A"
60000 LBS. CARS (ARCH BAR TRUCKS).
SECTION 'A-B'
SECTION 'B-C'
SPRING "B"
70000 LBS. CARS (ARCH BAR TRUCKS)
SECTION 'A-B'
SECTION 'B-C'
"A"
"B"
"C"
EIGHT BARS, FOUR BARS 1" DIA. 65¼" LONG TAPERED TO 72¼".
" " 5/8 " 62½" " " " 66¾"
NORMAL WT. OF EACH 1ST FOUR BARS 14 LBS. 12 OZ.; MINIMUM WT. 14 LBS. 5 OZ
" " " 2ND " " 5 " 6 " " " 3 "
OUTSIDE DIAM. 1ST FOUR COILS 5⅞", 2ND FOUR COILS 3¼"
HEIGHTS, 1ST FOUR COILS 5⅞" FREE; 4¾" SOLID; 5⅛" 3970 LBS. CAPY. 7440 LBS.
" 2ND " " 6½ " 4⅞" " 5⅛" 1530 " " 3060 "
CLUSTER OF SPRINGS
HEIGHTS EXCLUSIVE OF CAPS 6⅝" FREE; 4¾" SOLID. 5⅛" 22000 LBS. CAPY. 42000 LBS
4 BARS 1 3/16" DIA 73¾" LONG TAPERED TO 80⅛"
NORMAL WT. OF EACH BAR 23 LBS.; MINIMUM WT 22 LBS. 5 OZ.
OUTSIDE DIAM. 5⅞"
HEIGHTS, 8¼" FREE. 6⅜" SOLID. 7⅛" 7400 LBS. CAPY. 12500 LBS.
CLUSTER OF SPRINGS
HEIGHTS 8¼" FREE. 6⅜" SOLID. 7⅛" 29000 LBS. CAPY 50000 LBS

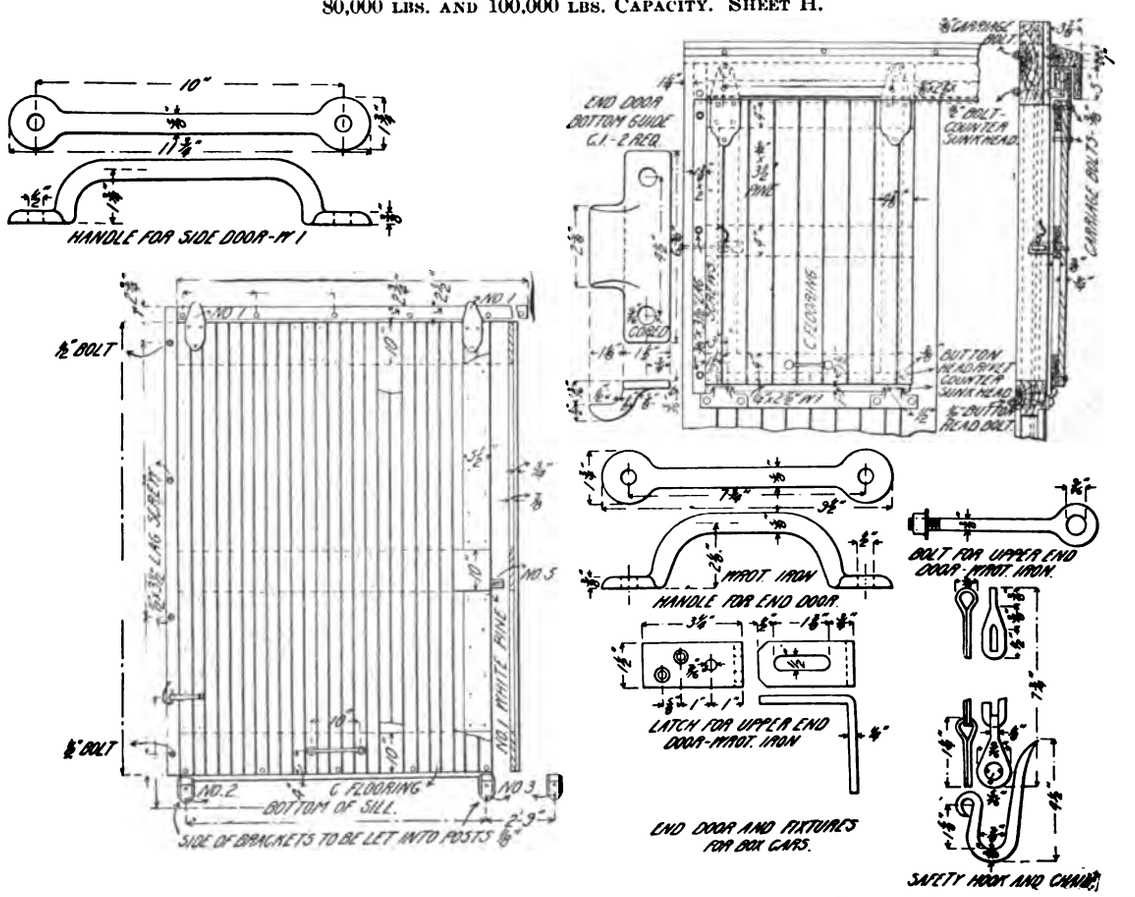
FIGS. 4655-4658. RECOMMENDED PRACTICE FOR SPRINGS AND SPRING CAPS, ARCH BAR TRUCKS, 60,000 LBS. AND 70,000 LBS. CAPACITY. SHEET H.



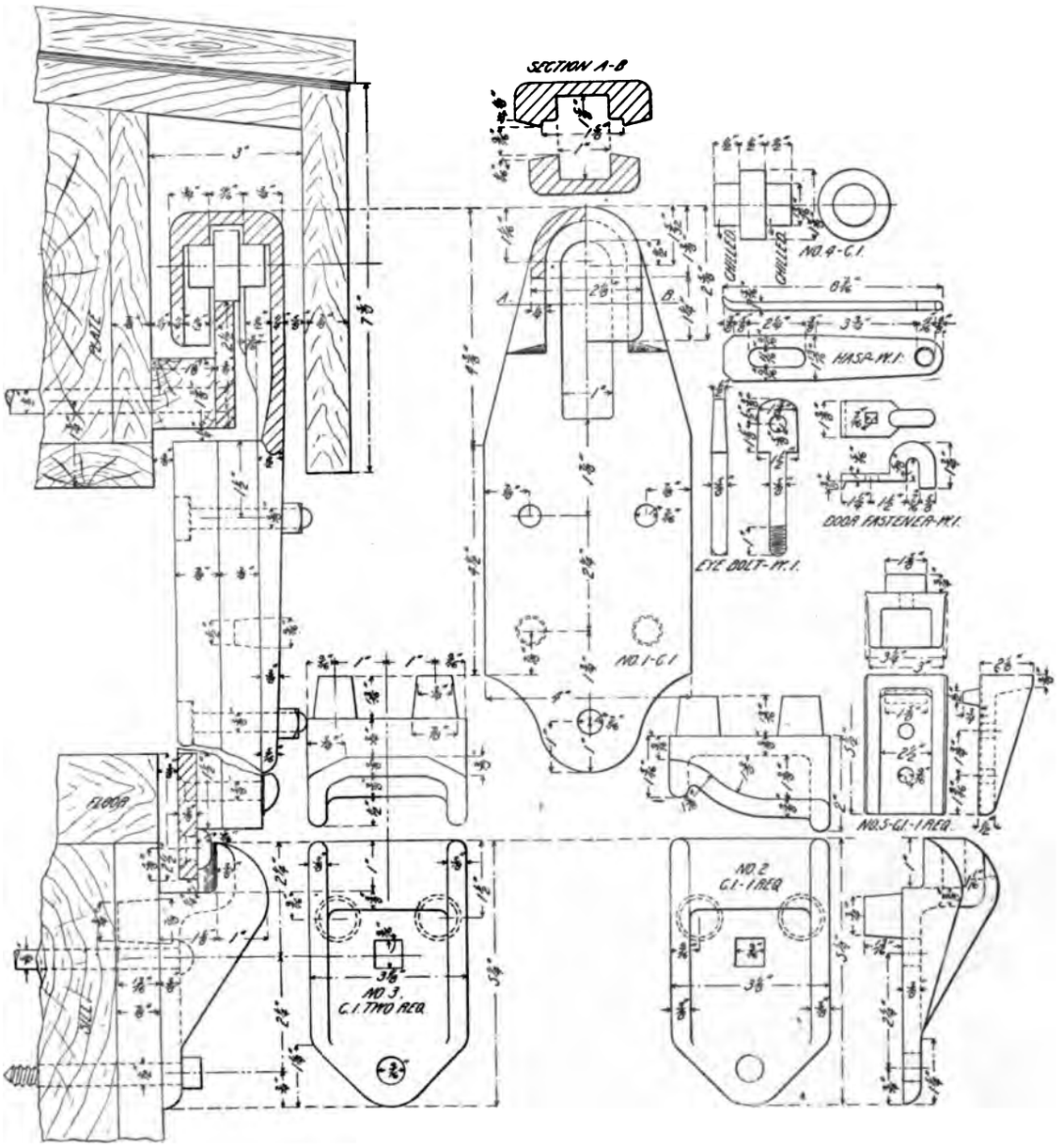
FIGS. 4659-4663. TWIST GAGE FOR M. C. B. COUPLER. SHEET G.


SPRING "C"
80000 LBS. CARS (ARCH BAR TRUCKS).
SECTION "A-B"
SECTION "B-C"
SPRING "D"
100000 LBS CARS (ARCH BAR TRUCKS)
SECTION "A-B"
SECTION "B-C"
6 BARS.
4 BARS 1⅜" DIA., 73¾" LONG, TAPERED TO 80⅜"
2 " ⅞" " 74¼" " " 77¾"
NORMAL WT. OF EACH 1ST FOUR BARS 23 LBS; MINIMUM WT. 22 LBS. 5 OZ.
" " " 2ND TWO " 6 LBS 7 OZ. " 6 - 4 "
OUTSIDE DIAM. OF 1ST FOUR COILS 5⅞"; 2ND TWO COILS 2⅞"
HEIGHTS: 1ST FOUR COILS 8¼" FREE, 6⅜" SOLID; 7¼" 7400 LBS. CAPY 12500 LBS.
" 2ND TWO " " " " " 2100 " " 3500 "
CLUSTER OF SPRINGS
HEIGHTS WITHOUT CAPS: 8¼" FREE; 6⅜" SOLID; 7¼" 33800 LBS: CAPY. 57000 LBS.
EIGHT BARS 4 BARS 1⅜" DIA., 73¾" LONG, TAPERED TO 80⅜"
4 " ⅞" " 74¼" " " 77¾"
NORMAL WT OF EACH 1ST FOUR BARS 23 LBS. MINIMUM WT. 22 LBS. 5 OZ.
" " " 2ND " " 6 LBS 7 OZ. " 6 - 4 "
OUTSIDE DIAM OF 1ST FOUR COILS 5⅞", 2ND FOUR 2⅞"
HEIGHTS, 1ST FOUR COILS 8¼" FREE: 6⅜" SOLID; 7¼" 7400 LBS CAPY 12500 LBS
" 2ND " " " " " 2100 " " 3500 "
CLUSTER OF SPRINGS
HEIGHTS WITHOUT CAPS 8¼" FREE, 6⅜" SOLID; 7¼" 38000 LBS. CAPY 64000 LBS

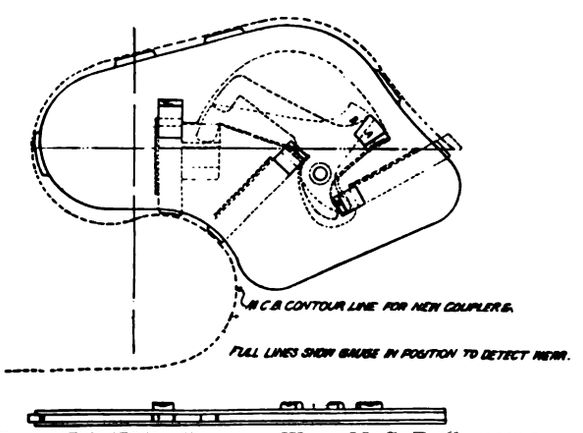
FIGS. 4664-4667. RECOMMENDED PRACTICE FOR SPRINGS AND SPRING CAPS FOR ARCH BAR TRUCKS, 80,000 LBS. AND 100,000 LBS. CAPACITY. SHEET H.



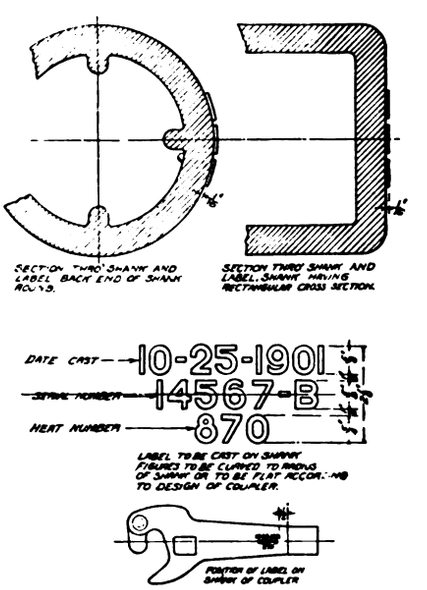
FIGS. 4668-4685. RECOMMENDED PRACTICE FOR BOX CAR SIDE AND END DOORS. SHEET F.



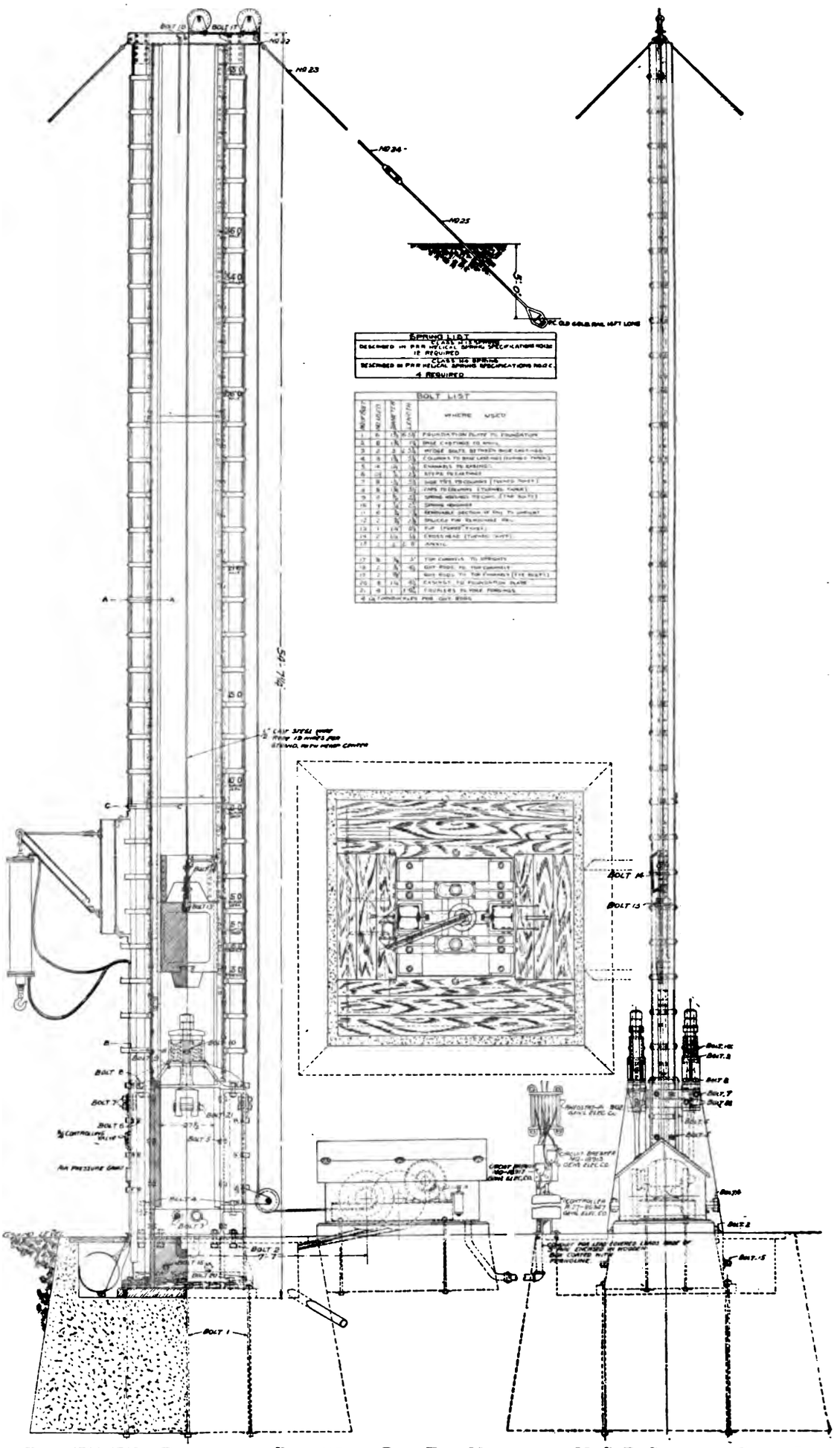
FIGS. 4686-4704. RECOMMENDED PRACTICE FOR BOX CAR SIDE AND END DOORS. SHEET F.



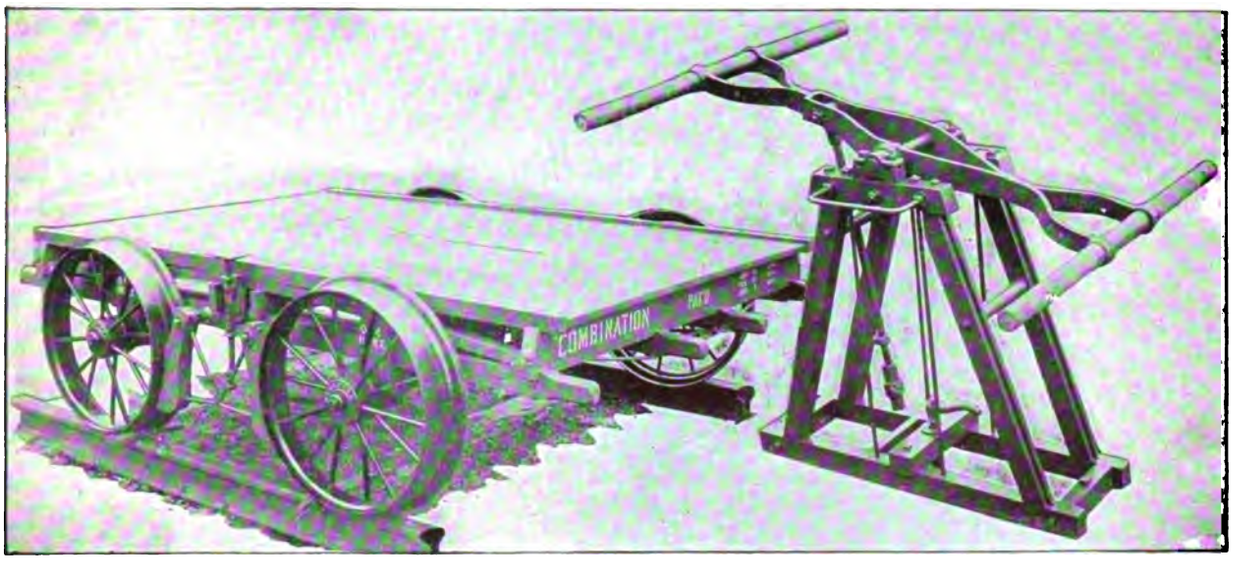
FIGS. 4705-4706. GAGE FOR WORN M. C. B. COUPLERS.


SECTION THRU SHANK AND LABEL BACK END OF SHANK ROUND.
SECTION THRU SHANK AND LABEL, SHANK HAVING RECTANGULAR CROSS SECTION.
DATE CAST → 10-25-1901
SERIAL NUMBER → 14567-B
HEAT NUMBER → 870
LABEL TO BE CAST ON SHANK FIGURES TO BE CURVED TO RADIUS OF SHANK OR TO BE FLAT ACCORDING TO DESIGN OF COUPLER.
POSITION OF LABEL ON SHANK OF COUPLER

FIGS. 4707-4710. MARKING OF COUPLERS BOUGHT ON TIME SPECIFICATIONS. SHEET I.



FIGS. 4711-4713. RECOMMENDED PRACTICE FOR DROP TEST MACHINE FOR M. C. B. COUPLERS. SHEET I. (338)



FIGS. 4714-4715. PERSPECTIVE VIEWS. COMBINATION WALKING BEAM HAND AND PUSH CAR. THE WALKING BEAM FRAME MAY BE DETACHED AS SHOWN. TURN BUCKLE PITMAN CONNECTION.

FIG. 4716. MOTOR INSPECTION CAR. SHEFFIELD CAR CO., MAKER.

FIG. 4717. NO. 4 PUSH CAR. SHEFFIELD CAR CO., MAKER.

FIG. 4718. HAND CAR. SHEFFIELD CAR CO., MAKER.

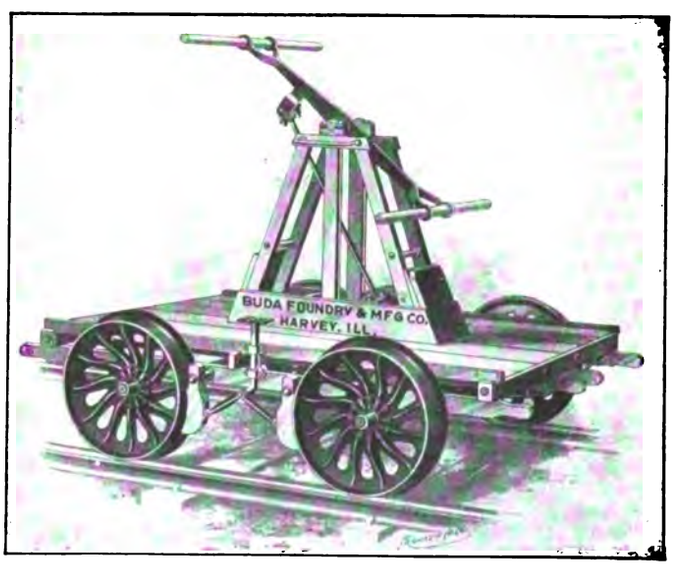


FIG. 4719. NO. 1 HAND CAR WITH STEEL WHEELS. BUDA F'DY. & MFG. CO., MAKER.

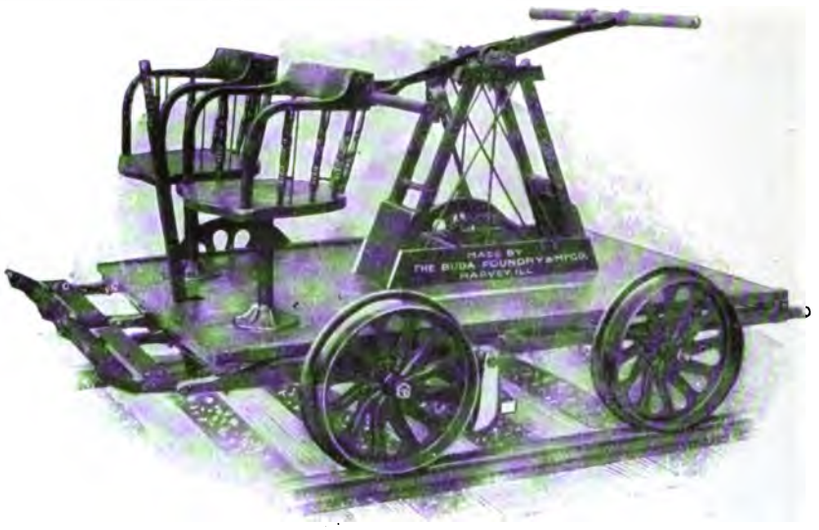


FIG. 4720. TWO SEATED INSPECTION CAR. NO. 5½.
BUDA F'DY & M'F'G CO., MAKERS.

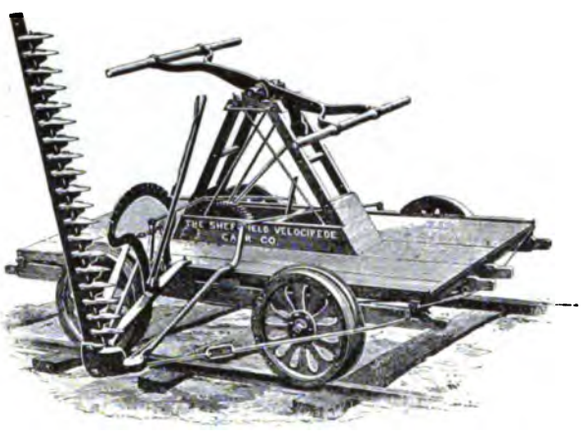


FIG. 4721. WEED CUTTING CAR.
SHEFFIELD CAR CO., MAKERS.

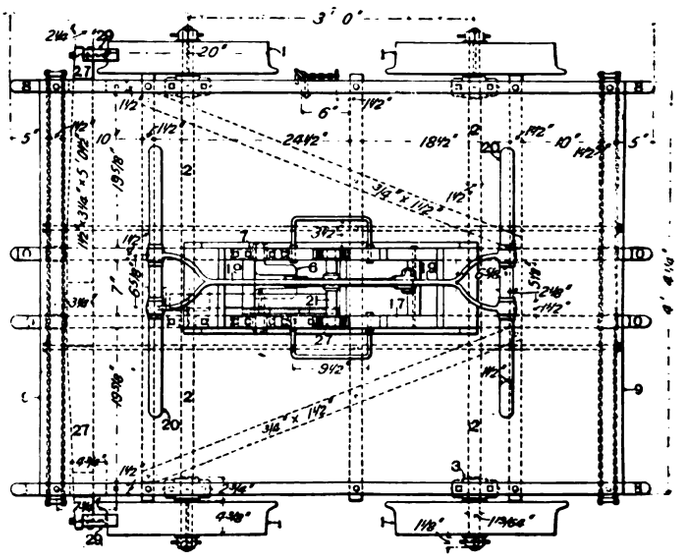


FIG. 4722. PLAN.

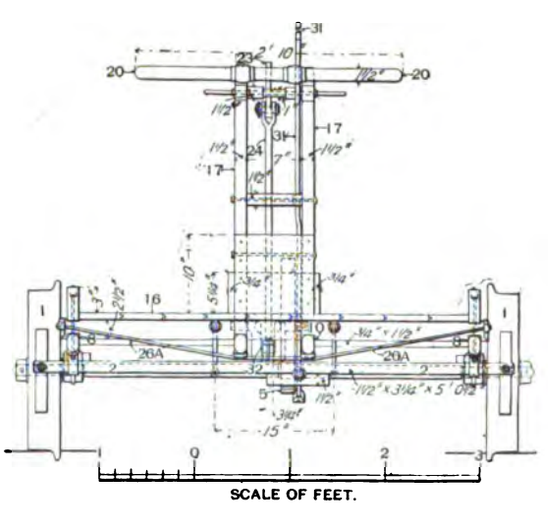


FIG. 4723. END ELEVATION.

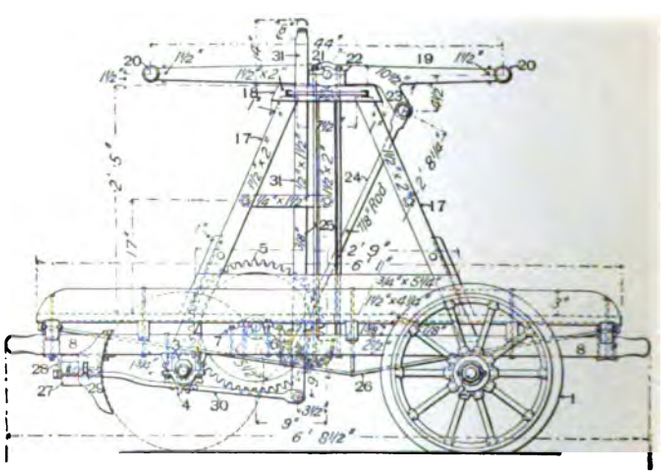


FIG. 4724. SIDE ELEVATION.

TRACK AND BRIDGE INSPECTORS' HAND CAR.
WABASH R. R.

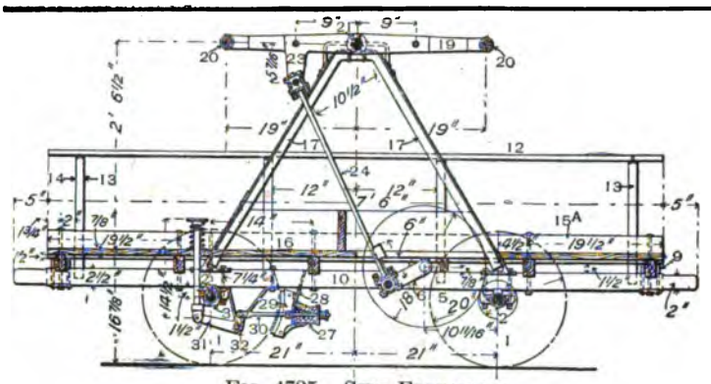


FIG. 4725. SIDE ELEVATION.

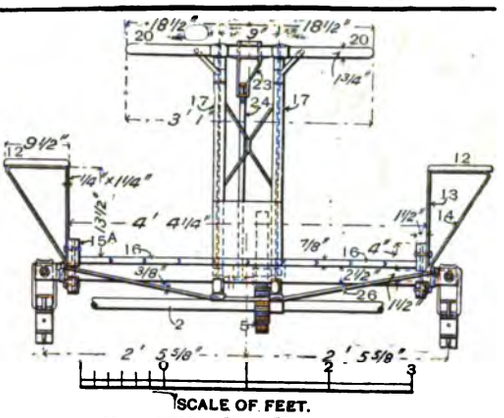


FIG. 4726. END ELEVATION.
HAND CAR. P. R. R.

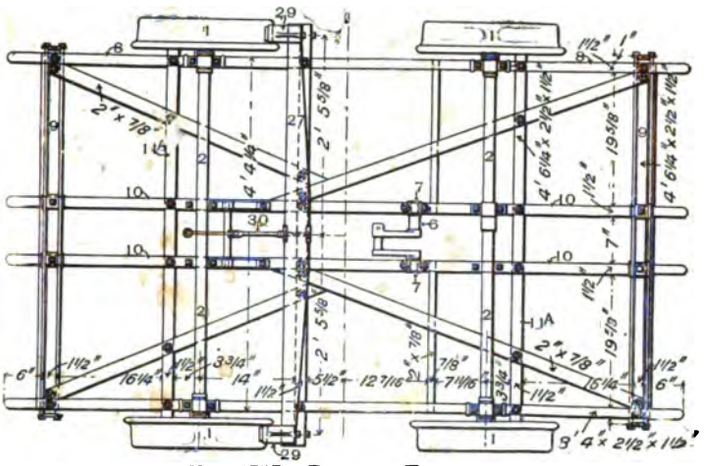


FIG. 4727. PLAN OF FRAMING.

NAMES OF PARTS OF HAND CAR.
FIGS. 4722-4727.

1. *Wheel*
2. *Axle*
3. *Journal Box*
4. *Pinion*
5. *Gear Wheel*
6. *Crank Shaft*
7. *Crank Shaft Bearings*
8. *Side Sills*
9. *End Sills*
10. *Center Sills*
11. *Cross Frame Tie Timber, or Needle Beam*

11a. *Transverse Floor Timbers*

12. *Seat*
13. *Seat Bracket*
14. *Seat Bracket Brace*
15. *Rave, or Seat Riser*
16. *Floor*
17. *Lever Frame Post*
18. *Lever Frame Cap*
19. *Hand Car Lever*
20. *Lever Handle*
21. *Lever Shaft*
22. *Lever Shaft Bearings*
23. *Bell Crank*
24. *Connecting Rod*
25. *Lever Frame Tie Rod*
26. *Hand Car Truss Rod*

26a. *Cross Frame Truss Rod*

27. *Brake Beam*
28. *Brake Beam Hanger*
29. *Brake Head*
30. *Brake Rod*
31. *Brake Lever*
32. *Brake Lever Fulcrum*

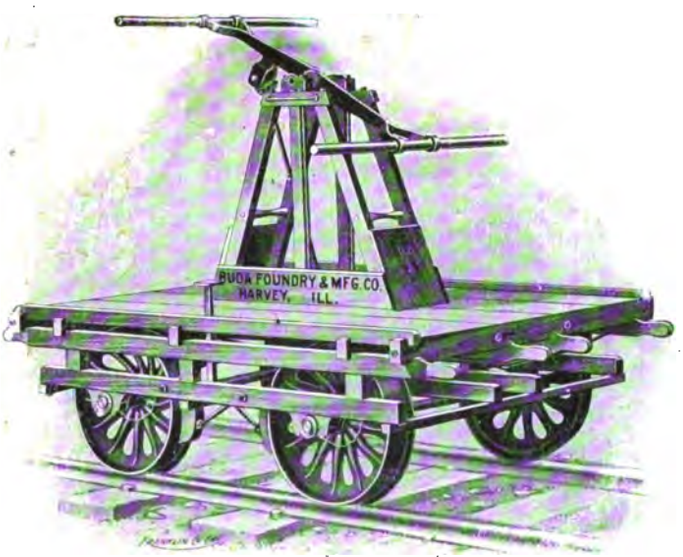


FIG. 4728. NO. 3. NARROW GAGE HAND CAR.
BUDA F'DY & MFG. CO., MAKERS.

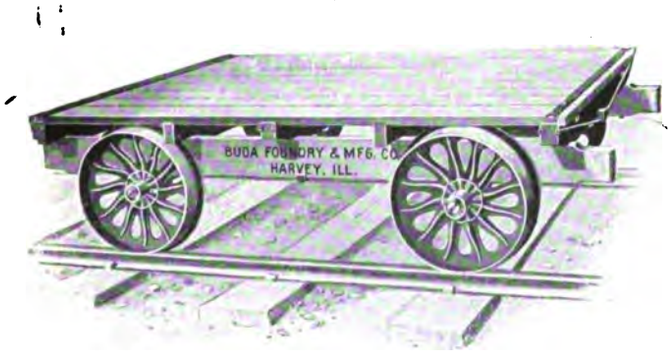


FIG. 4729. NO. 6½. EXTRA HEAVY PUSH CAR.
BUDA F'DY & MFG. CO., MAKERS.

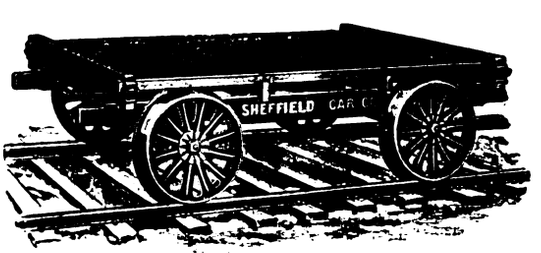


FIG. 4730. PUSH CAR.
SHEFFIELD CAR CO., MAKERS.

FIG. 4731. BRILL'S CONVERTIBLE CAR, OPEN. J. G. BRILL CO.

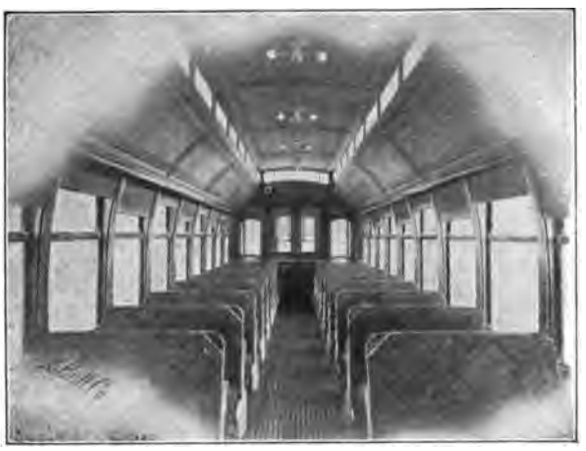


FIG. 4732. INTERIOR OF BRILL'S SEMI-CONVERTIBLE CAR.

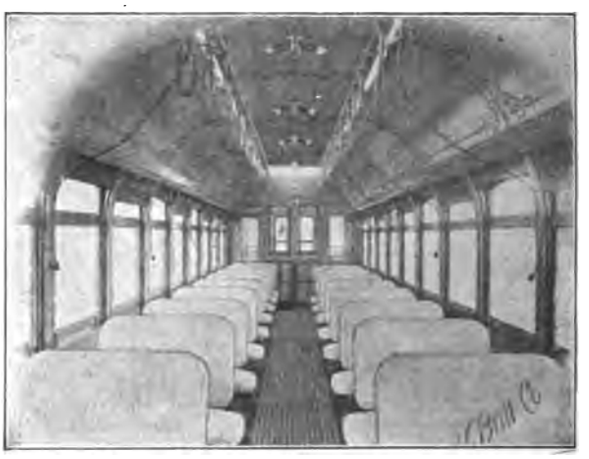


FIG. 4733. INTERIOR OF BRILL'S CONVERTIBLE CAR.
J. G. BRILL CO.

FIG. 4734. BRILL'S CONVERTIBLE CAR, CLOSED. J. G. BRILL CO.

FIG. 4735. BRILL'S SEMI-CONVERTIBLE CAR, CLOSED. J. G. BRILL CO.

FIG. 4736. NARRAGANSETT TYPE, OPEN CAR.

FIG. 4737. COMBINATION OPEN AND CLOSED CAR.

FIG. 4738. METROPOLITAN TYPE, OPEN CAR.

FIG. 4739. METROPOLITAN TYPE, CLOSED CAR.
ELECTRIC CARS MADE BY THE J. G. BRILL CO.

FIG. 4740. PARLOR CAR, "MARYLAND." BALTIMORE ST. RY.

FIG. 4741. INTERIOR, PARLOR CAR "MARYLAND."

FIG. 4742. DOUBLE TRACK ELECTRIC SNOW PLOW.

FIG. 4743. INTERURBAN EXPRESS CAR.
ELECTRIC CARS MADE BY THE J. G. BRILL CO.

FIG. 4744. HIGH SPEED INTERURBAN CAR. ST. LOUIS CAR CO., BUILDERS.

FIG. 4745. INTERIOR OF ELEVATED CAR.
NORTHWESTERN ELEVATED, CHICAGO.
ST. LOUIS CAR CO., BUILDERS.

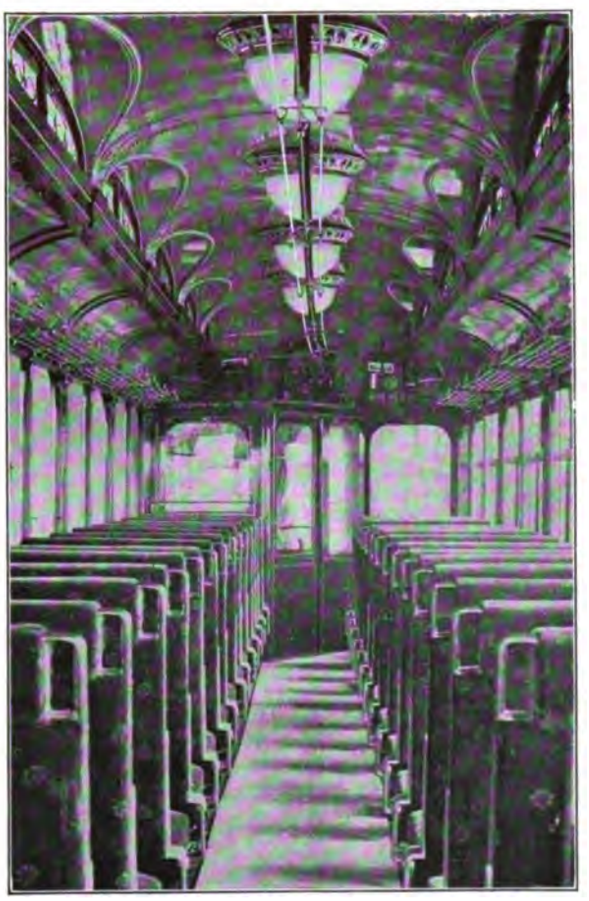
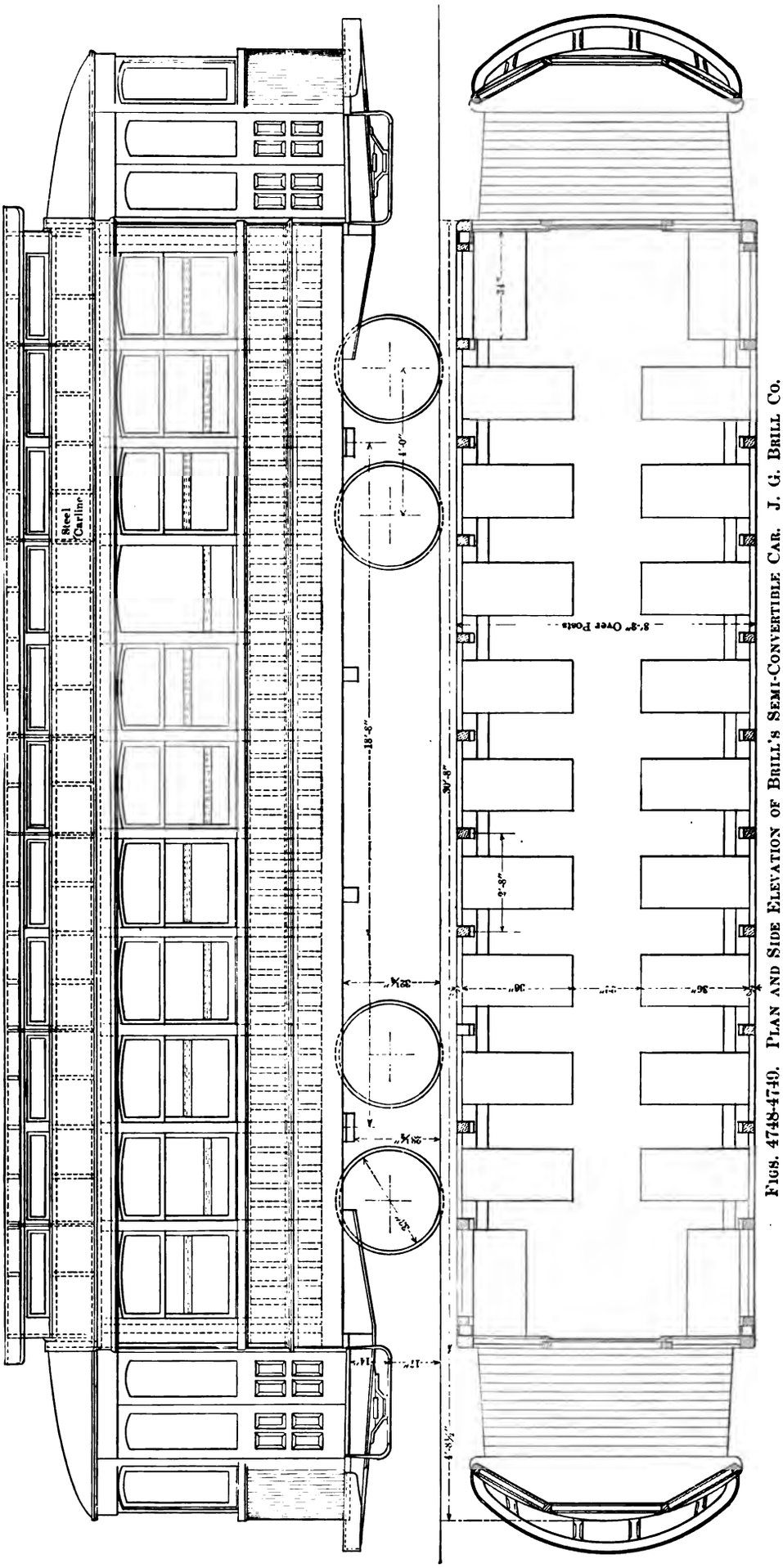
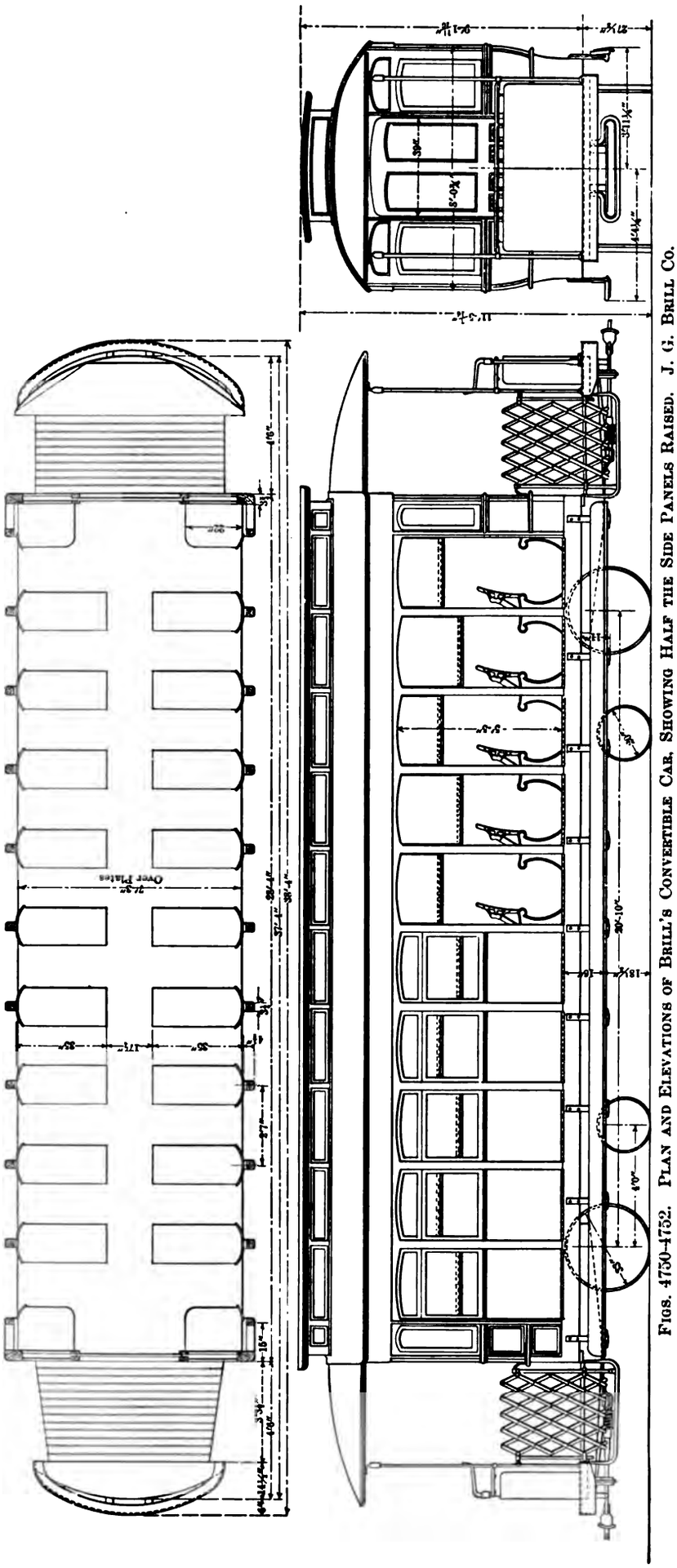


FIG. 4746. INTERIOR OF HIGH SPEED INTERURBAN CAR. CANTON-AKRON RY.
ST. LOUIS CAR CO., BUILDERS.

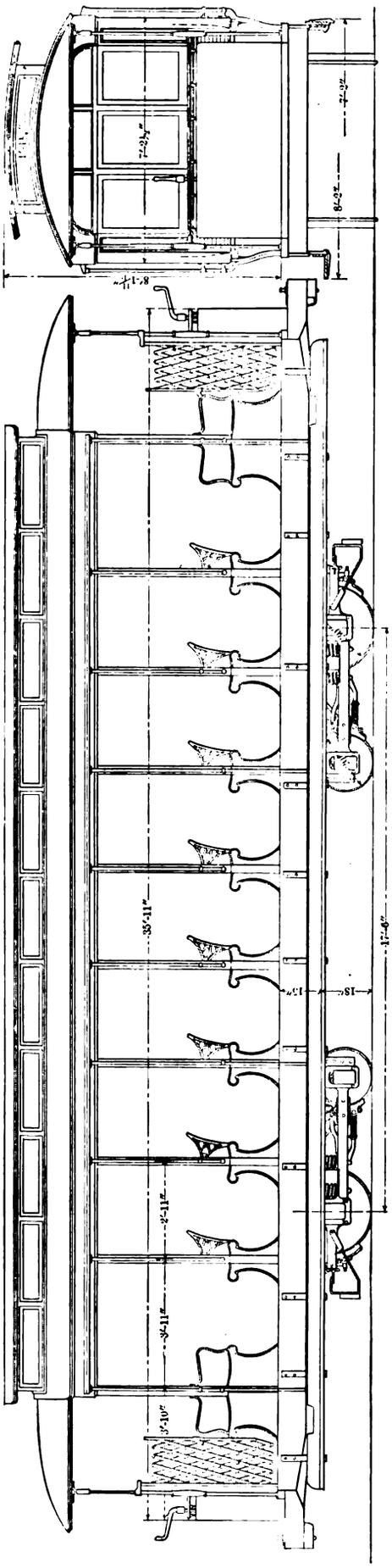
FIG. 4747. HIGH SPEED INTERURBAN CAR FOR CLEVELAND & EASTERN RY.
ST. LOUIS CAR CO., BUILDERS.



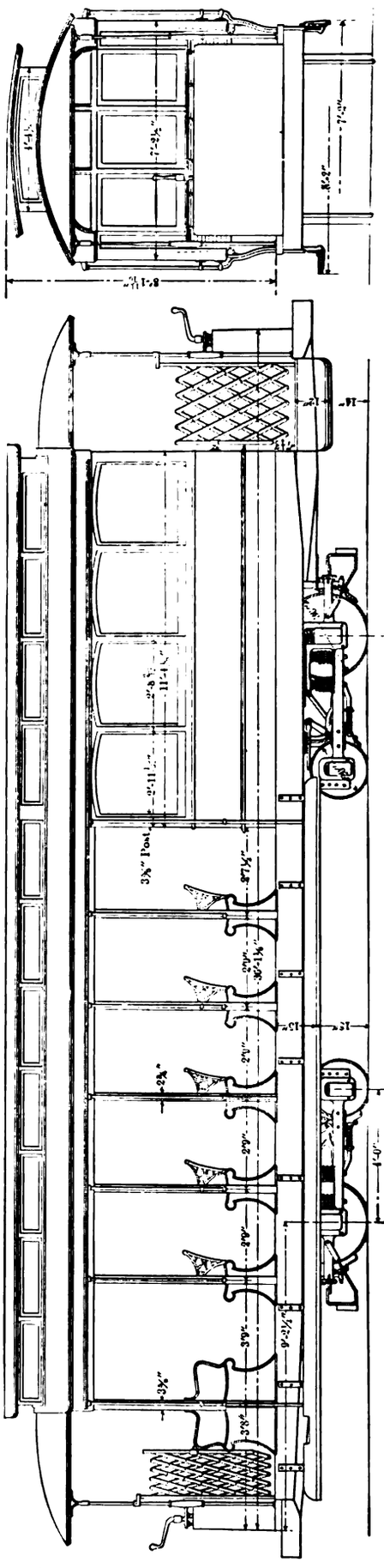
FIGS. 4748-4749. PLAN AND SIDE ELEVATION OF BRILL'S SEMI-CONVERTIBLE CAR. J. G. BRILL CO.



Figs. 4750-4752. Plan and Elevations of Brill's Convertible Car, Showing Half the Side Panels Raised. J. G. Brill Co.



Figs. 4753-4754. Side and End Elevations of Metropolitan Type, Open Car. J. G. Brill Co.



Figs. 4755-4756. Side and End Elevations of Metropolitan Type, Combination Car. J. G. Brill Co.

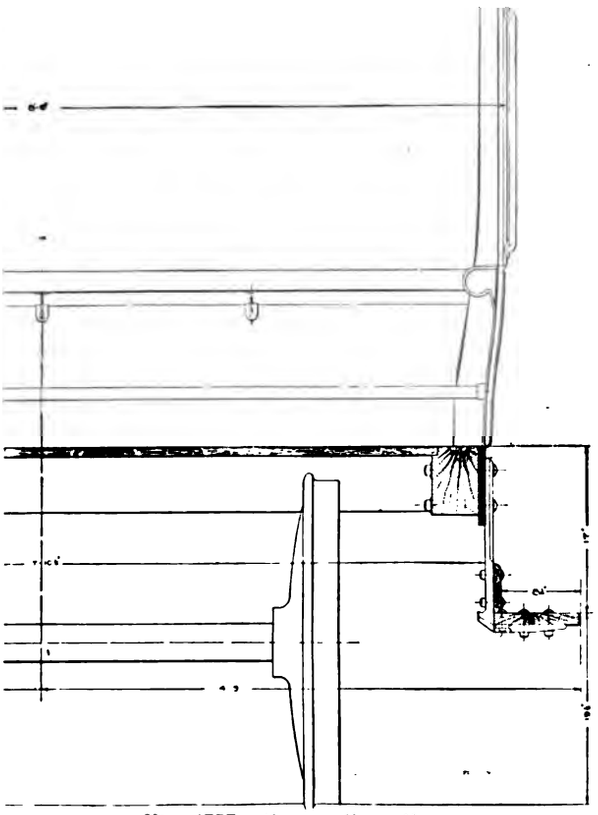


FIG. 4757. SINGLE STEP CAR.

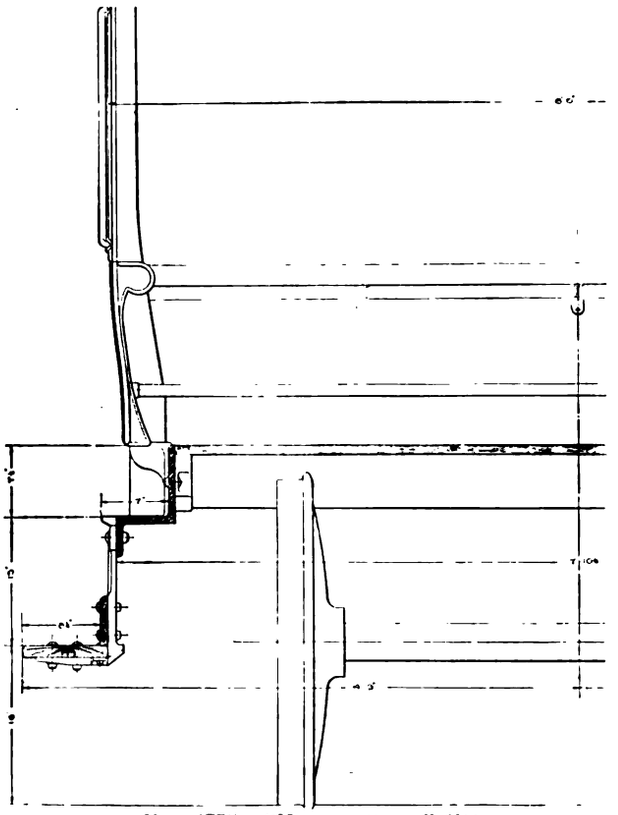


FIG. 4758. "NARRAGANSETT" CAR.

SECTIONS OF STANDARD SINGLE STEP AND "NARRAGANSETT" CARS SHOWING DIFFERENT FORMS OF CONSTRUCTION. J. G. BRILL CO.

FIG. 4759. PANELS AND WINDOWS LOWERED.

FIG. 4760. SHOWING DETAILS OF GROOVES.

FIG. 4761. PANELS AND WINDOWS STORED IN ROOF POCKET.

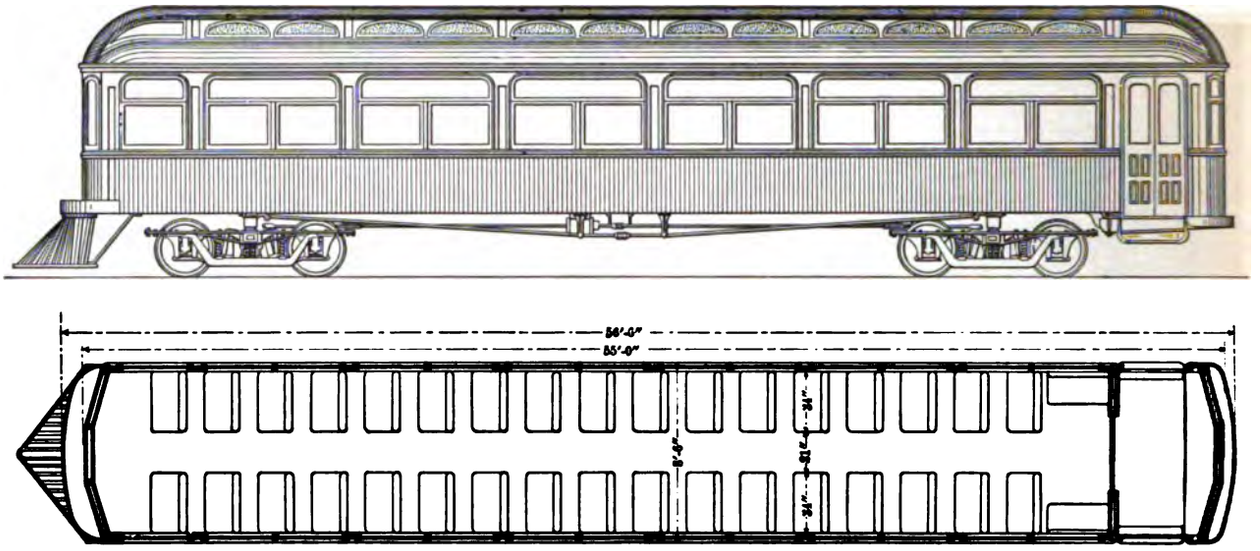
FIG. 4762. STANDARD CAR.

FIG. 4763. SEMI-CONVERTIBLE CAR. SASHES RAISED.

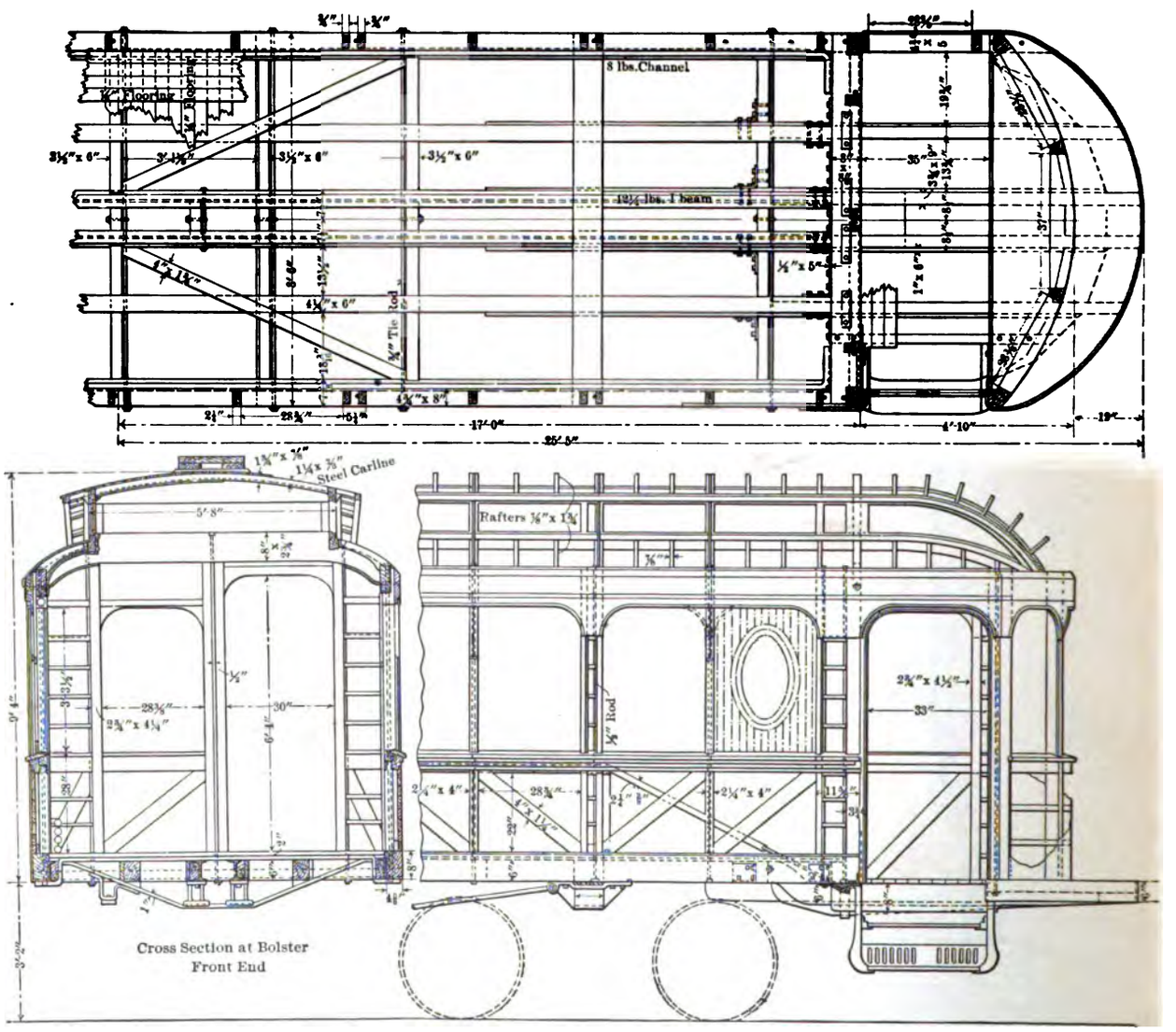
FIG. 4764. SEMI-CONVERTIBLE CAR. SASHES LOWERED.

FIGS. 4759-4761. SECTIONS OF BRILL'S CONVERTIBLE CAR. J. G. BRILL CO.

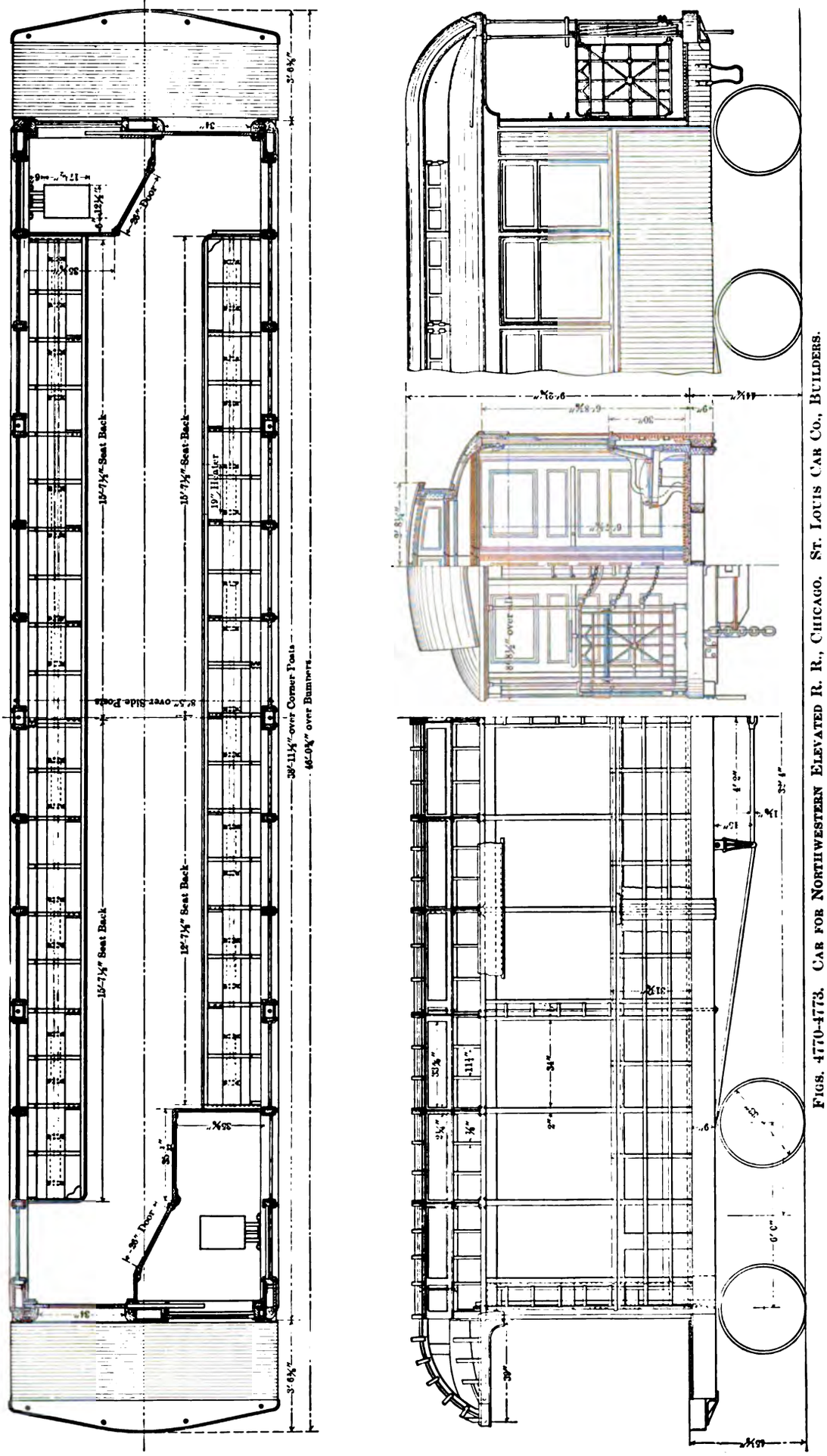
FIGS. 4762-4764. SECTIONS OF BRILL'S SEMI-CONVERTIBLE CAR. J. G. BRILL CO.



Figs. 4765-4766. Side Elevation and Floor Plan, 55 ft. Coach. Cleveland & Eastern.
St. Louis Car Co., Builders.



Figs. 4767-4769. Part Side Elevation, Plan and Section of Framing, 55 ft. Coach, Cleveland & Eastern.
St. Louis Car Co., Builders.



Figs. 4770-4773. Car for Northwestern Elevated R. R., Chicago. St. Louis Car Co., Builders.

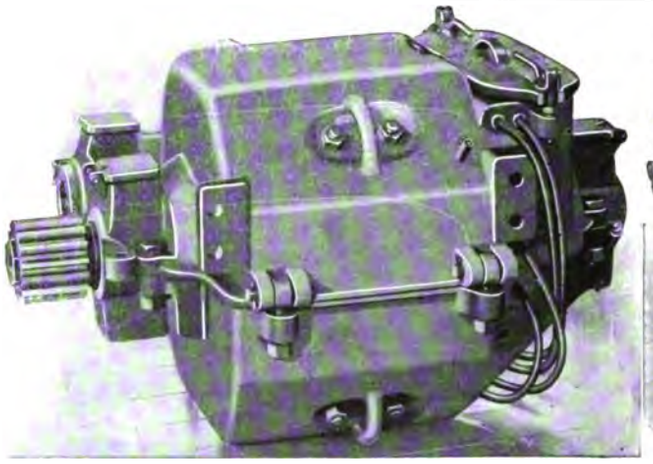


FIG. 4774. G. E.—67 RAILWAY MOTOR, 40-H.P., FOR CITY AND LIGHT SUBURBAN SERVICE. FRONT VIEW, CLOSED.

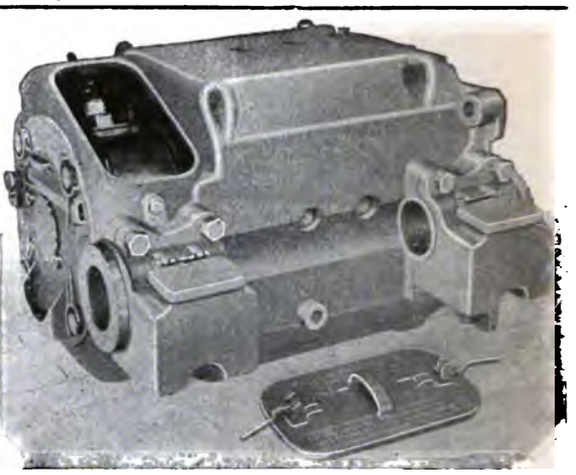


FIG. 4775. G. E.—66 MOTOR, REAR VIEW.

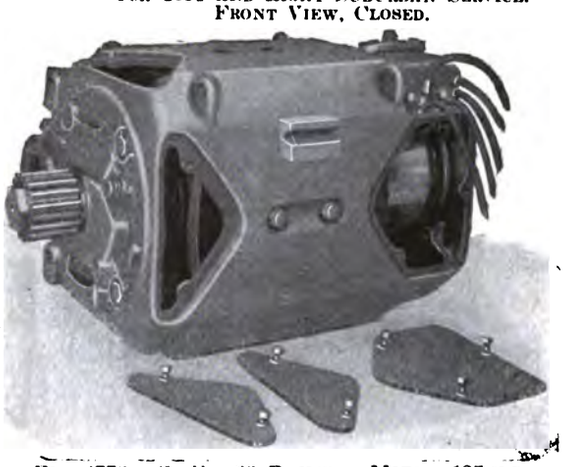


FIG. 4776. G. E.—66 RAILWAY MOTOR, 125-H.P., USED ON MANHATTAN ELEVATED RAILWAY, NEW YORK. FRONT VIEW, COVERS REMOVED.

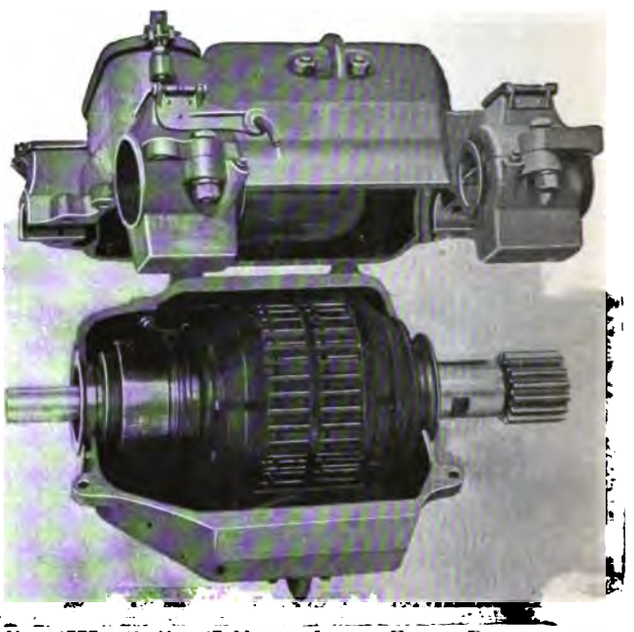
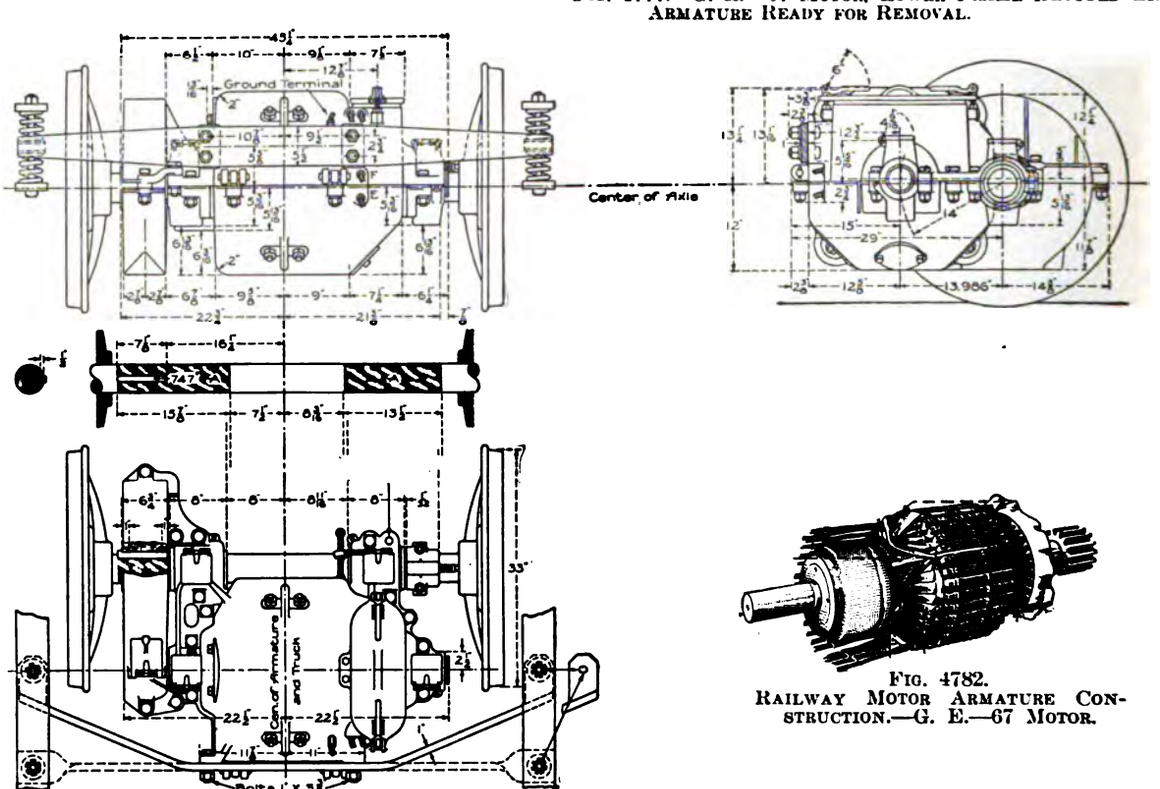
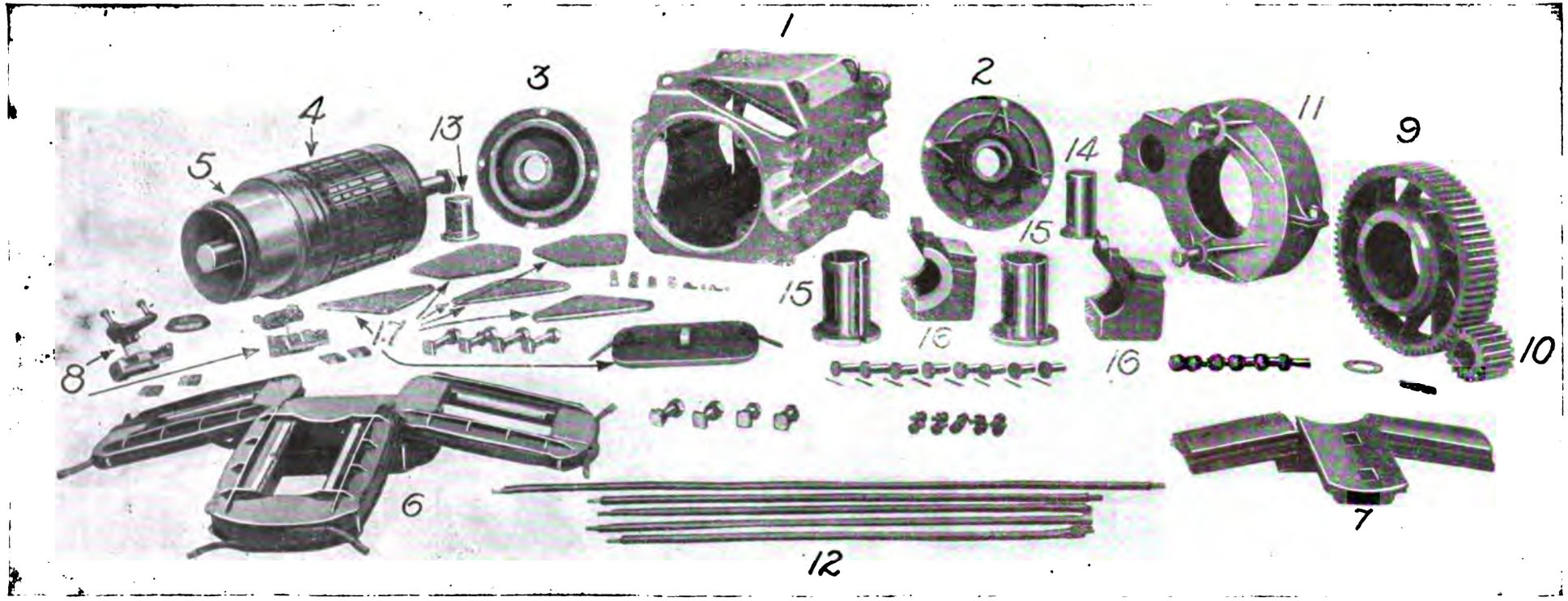


FIG. 4777. G. E.—67 MOTOR, LOWER FRAME DROPPED AND ARMATURE READY FOR REMOVAL.



FIGS. 4778-4781. RAILWAY MOTOR SUSPENSION. YOKE FORM OF SUSPENSION AS APPLIED TO G. E.—67 MOTOR.

FIG. 4782. RAILWAY MOTOR ARMATURE CONSTRUCTION.—G. E.—67 MOTOR.



FIGS. 4783-4815. DETAILS OF G. E.—66 MOTOR.

1. *Magnet Frame*
2. *Frame Head, Commutator End*
3. *Frame Head, Pinion End*
4. *Armature*
5. *Commutator*
6. *Field Coils*
7. *Laminated Pole Pieces.*
8. *Brush Holders*
9. *Gear*
10. *Pinion*
11. *Gear Case*
12. *Connection Cables*
13. *Armature Shaft Lining, Pinion End*
14. *Armature Shaft Lining, Commutator End*
15. *Axle Linings*
16. *Axle Bearing Caps*
17. *Ventilating Covers*

FIGS. 4816-4819. THREE-WAY SNAP SWITCH FOR LIGHTING CIRCUIT.

FIG. 4820. THREE-LIGHT CLUSTER FOR DECK LIGHTS.

FIG. 4821. KEYLESS LAMP SOCKET FOR CLUSTER.

FIG. 4822. KEYLESS LAMP SOCKET AND BASE.

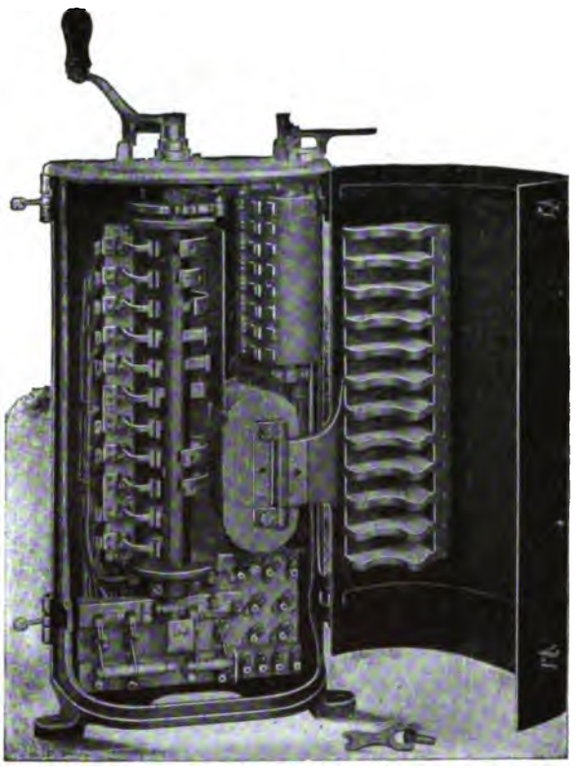


Fig. 4823.
K-10 Series Parallel Controller.
General Electric Company.

Fig. 4824.
K-6 Series Parallel Controller.
General Electric Company.

Fig. 4825. Car Wattmeter.
General Electric Company.

Fig. 4826.
M. D. Lightning Arrester in Wooden Box.
General Electric Company.

Fig. 4827. Third Rail Shoes.
General Electric Spring Type.

Figs. 4828-4829.
M. D. Lightning Arrester. Covers Removed.
General Electric Company.

Figs. 4830-4833.
Lightning Switch and Cut-Out.
General Electric Company.

Fig. 4834.
Open Conduit Plow.

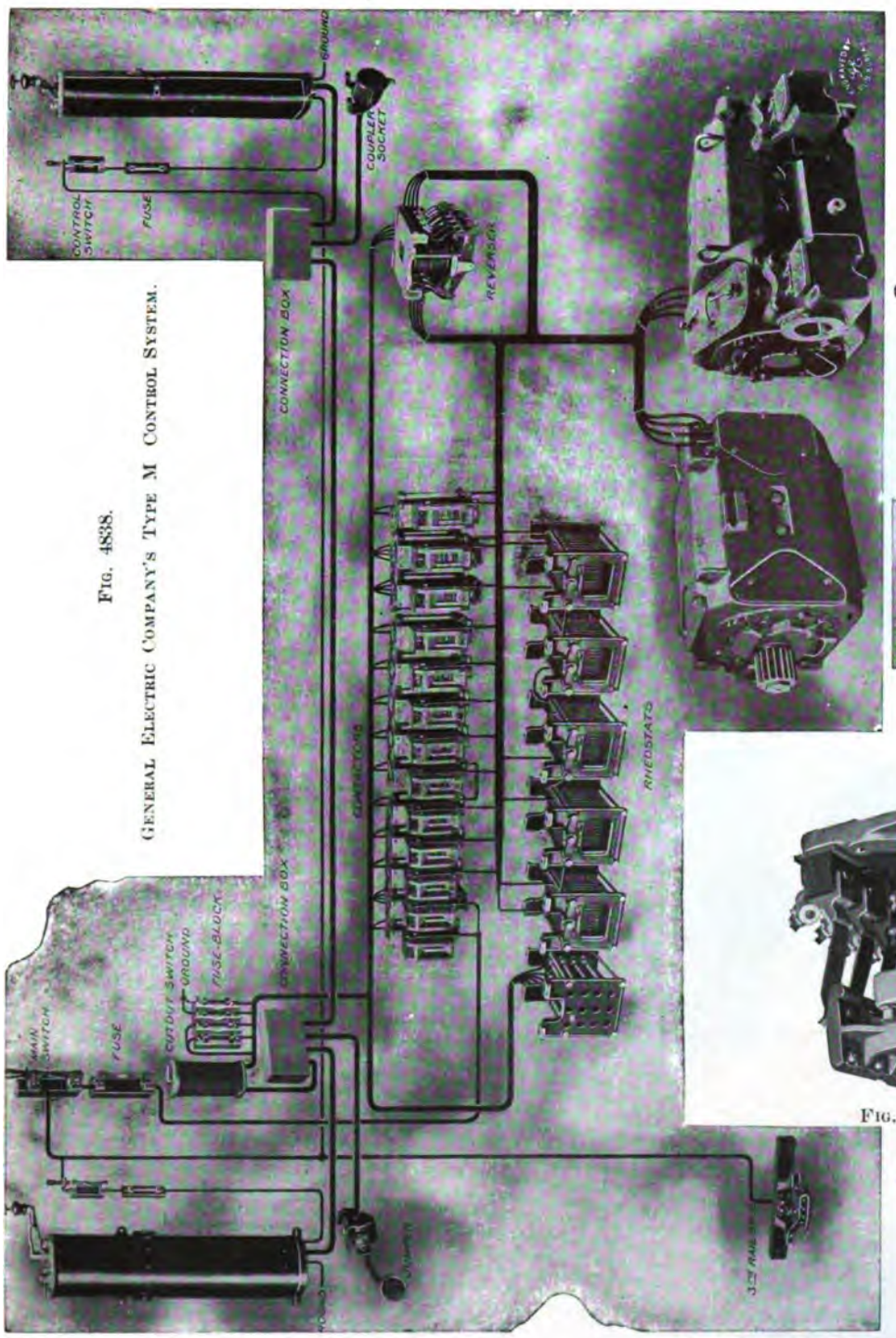


FIG. 4838. GENERAL ELECTRIC COMPANY'S TYPE M CONTROL SYSTEM.

FIG. 4835. MASTER CONTROLLER COVER OFF.

FIG. 4836. REVERSER.

FIG. 4837. CONTACTOR.

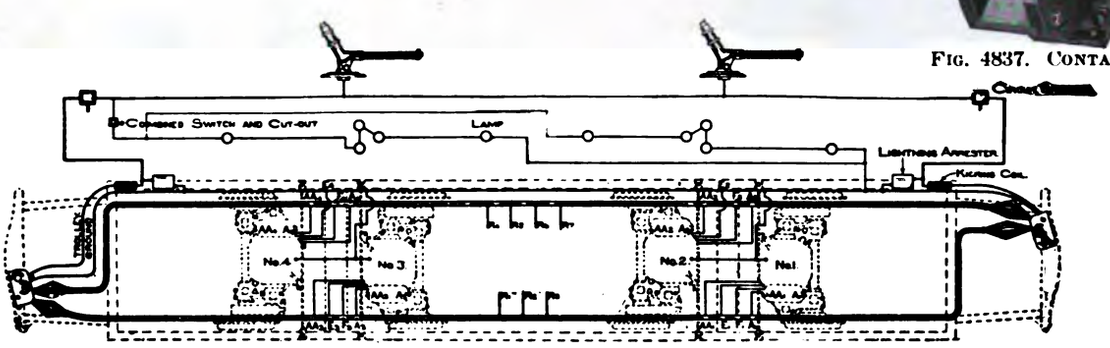


FIG. 4839. CAR WIRING FOR TWO SERIES PARALLEL CONTROLLERS AND FOUR MOTORS. GENERAL ELECTRIC COMPANY.

FIG. 4840.
COMMUTATOR CONSTRUCTION, G. E.—67 MOTOR.

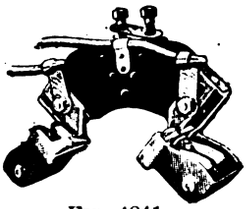


FIG. 4841.
BRUSH HOLDER. G. E.—67 MOTOR.

FIGS. 4842-4849.
CYLINDER FRAME. CYLINDER HEADS. PISTON. SHAFT AND LININGS. C. P.—14 AIR PUMP.

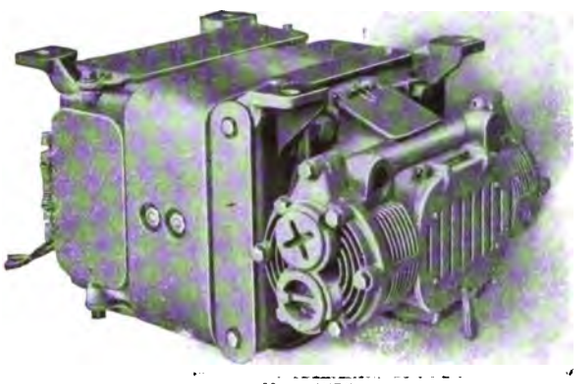
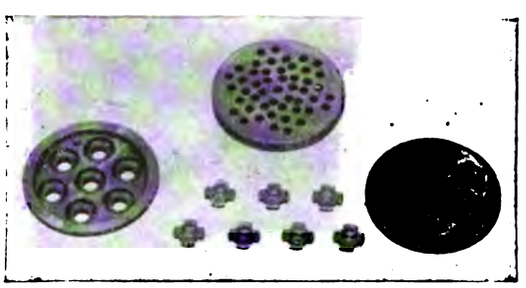


FIG. 4850.
GENERAL ELECTRIC COMPANY'S AIR PUMP AND MOTOR. C. P.—14.

FIGS. 4851-4857.
ARMATURE, FIELD COILS AND BRUSH HOLDERS. C. P.—14 AIR PUMP.



FIGS. 4858-4861.
VALVE PARTS. C. P.—14 AIR PUMP.

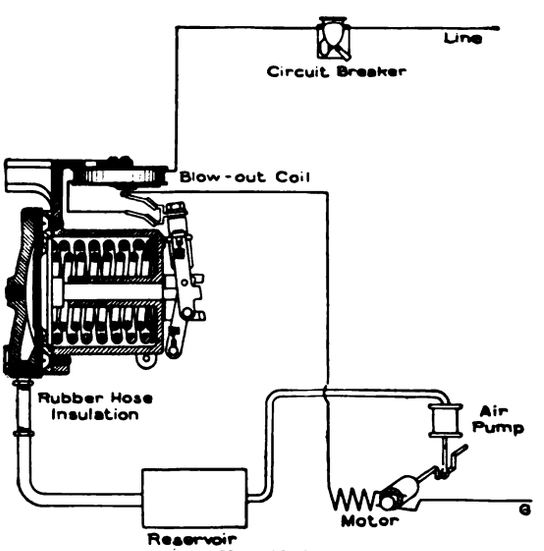


FIG. 4862.
DIAGRAM OF CONNECTIONS FOR GENERAL ELECTRIC AIR PUMP AND GOVERNOR.

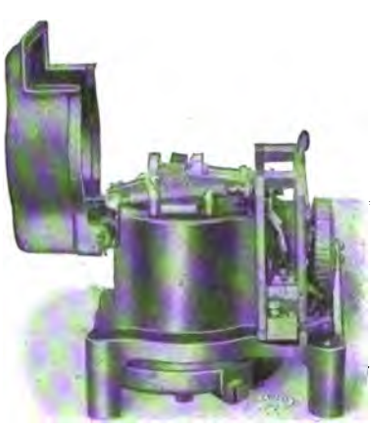
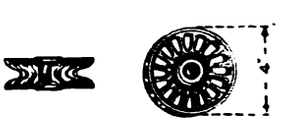


FIG. 4863.
GENERAL ELECTRIC COMPANY'S AIR PUMP GOVERNOR, COVER RAISED.

FIG. 4864.
TROLLEY HARP OR FORK.



FIGS. 4865-4866.
TROLLEY WHEEL, SLEET CUTTER.

FIGS. 4867-4868.
TROLLEY WHEEL, ORDINARY TYPE.

FIGS. 4869-4870.
TROLLEY WHEEL, HIGH SPEED TYPE.

FIGS. 4871-4872.
COUPLER SOCKET AND PLUGS.
GENERAL ELECTRIC CO.

FIG. 4873.
U. S.-G. TROLLEY BASE.
GENERAL ELECTRIC CO.

FIG. 4874. THIRD RAIL SHOE MOUNTED ON CAR TRUCK.
GENERAL ELECTRIC CO.

FIG. 4875.
OPEN CONDUIT PLOW.
GENERAL ELECTRIC CO.

FIG. 4876.
RHEOSTAT. GENERAL ELECTRIC CO.

FIG. 4877.
FUSE BOX, BLOWOUT TYPE.
GENERAL ELECTRIC CO.

FIG. 4878.
THIRD RAIL SHOE.
GENERAL ELECTRIC GRAVITY TYPE.
(357)

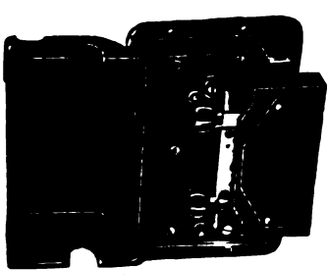


FIG. 4879.
FUSE BOX, METAL ENCLOSED.
GENERAL ELECTRIC CO.

FIG. 4880.
MAGNETIC BLOWOUT CIRCUIT BREAKER.
GENERAL ELECTRIC CO.

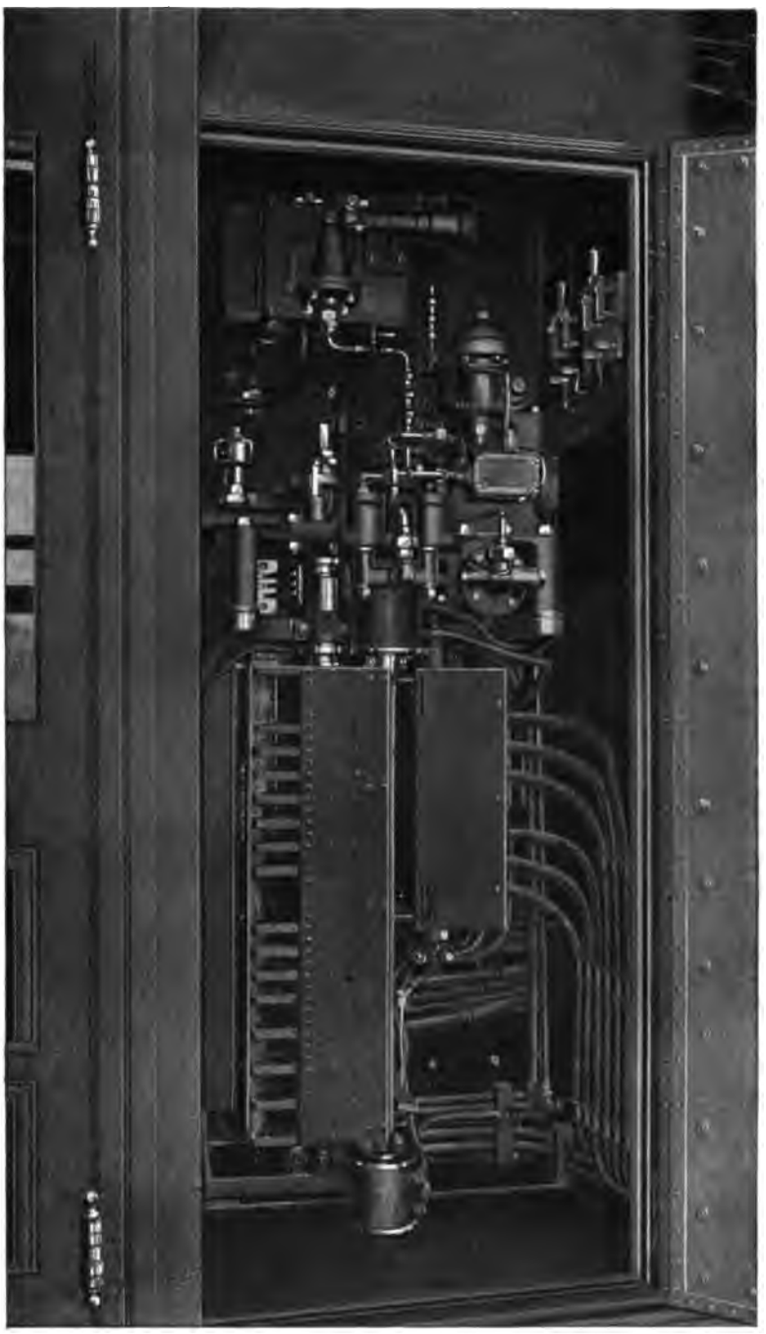


FIG. 4881. VIEW OF CONTROLLER COMPARTMENT, OPEN. WESTINGHOUSE ELECTRO-PNEUMATIC SYSTEM OF CONTROL.

FIG. 4882. MULTIPLE CONTROL SWITCH, CLOSED.

FIG. 4883. CIRCUIT BREAKER.

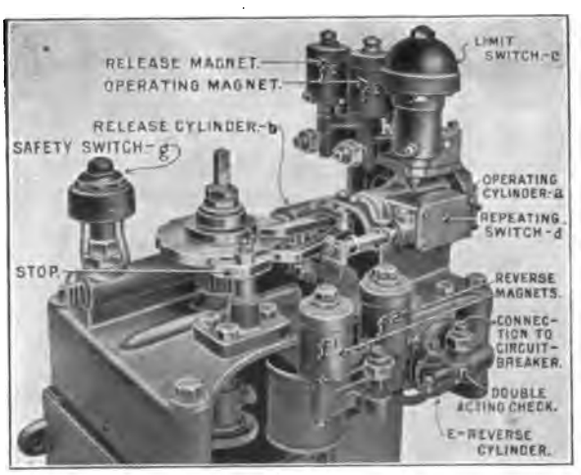


FIG. 4884. OPERATING HEAD.
WESTINGHOUSE ELECTRO-PNEUMATIC SYSTEM OF MOTOR CONTROL.
WESTINGHOUSE AIR BRAKE CO., MAKERS.

FIGS. 4885-4886. CAR CONNECTIONS.

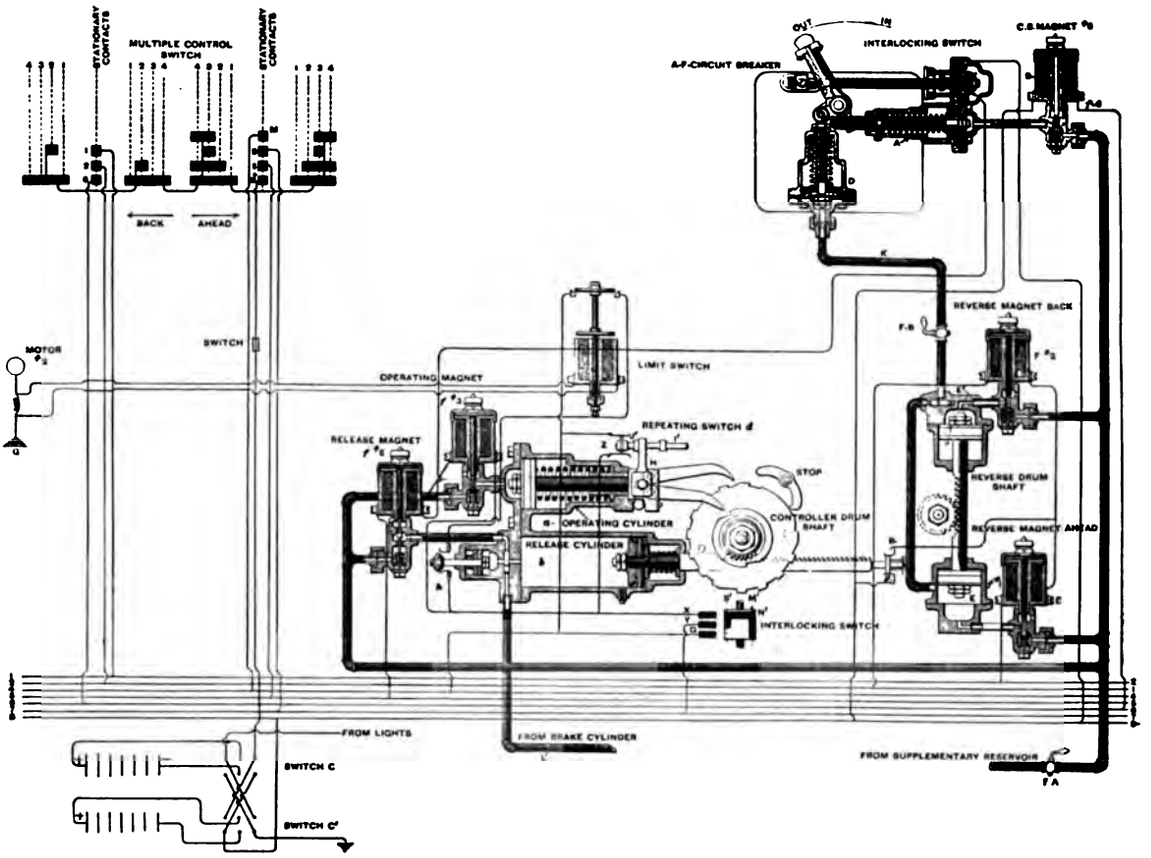


FIG. 4887. DIAGRAM OF CONNECTIONS FOR WESTINGHOUSE ELECTRO-PNEUMATIC SYSTEM OF MOTOR CONTROL.

FIG. 4888. WESTINGHOUSE MOTOR NO. 38B, SHOWING CRADLE SUSPENSION.
WESTINGHOUSE ELECTRIC & MFG. CO.

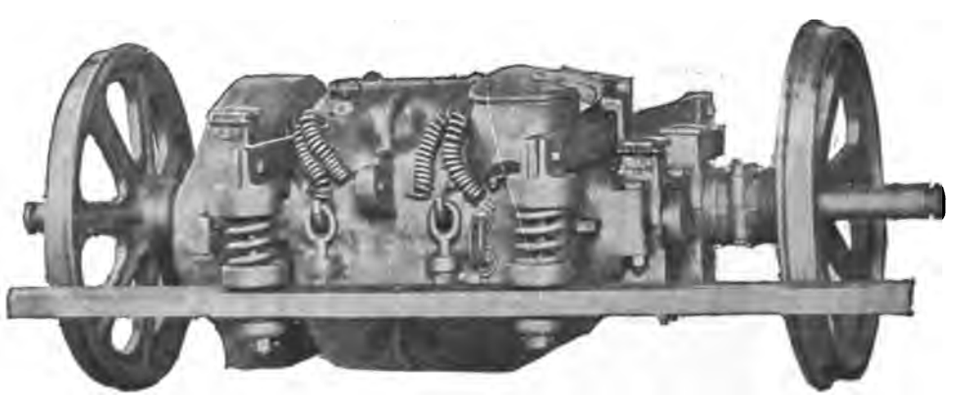


FIG. 4889. WESTINGHOUSE MOTOR NO. 38B, SHOWING PARALLEL BAR SUSPENSION.
WESTINGHOUSE ELECTRIC & MFG. CO.

FIG. 4890. WESTINGHOUSE MOTOR NO 38B, SHOWING HOSE SUSPENSION.
WESTINGHOUSE ELECTRIC & MFG. CO.

FIG. 4891. NO. 76. RAILWAY MOTOR ARMATURE WITH PINION.
WESTINGHOUSE ELECTRIC & MFG. CO.

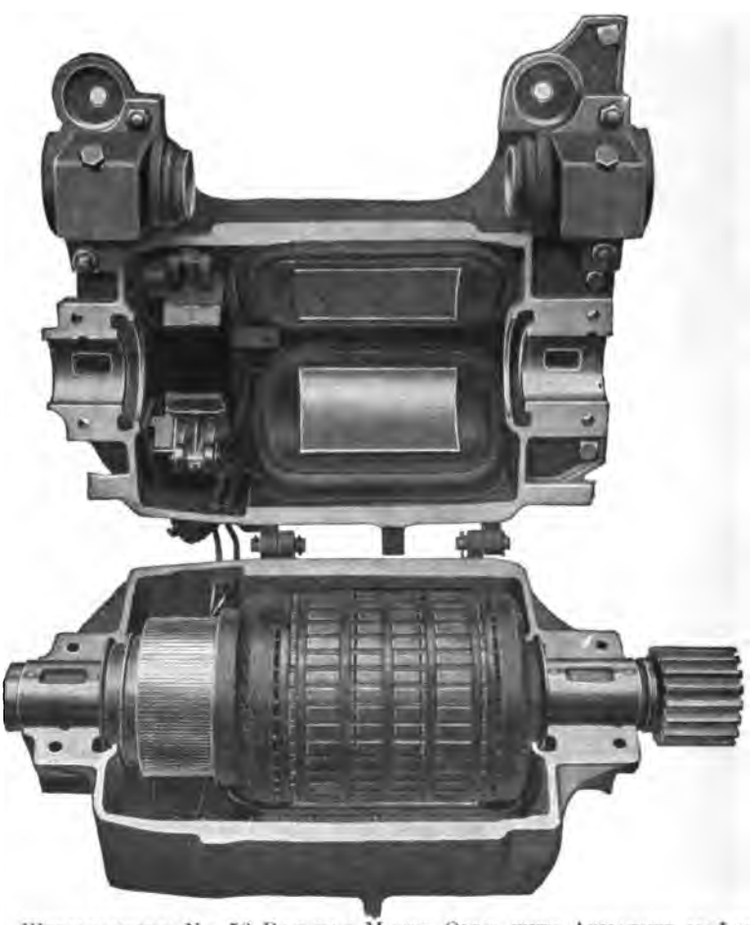


FIG. 4892. WESTINGHOUSE NO. 56 RAILWAY MOTOR, OPEN, WITH ARMATURE IN LOWER FIELD.
WESTINGHOUSE ELECTRIC & MFG. CO.

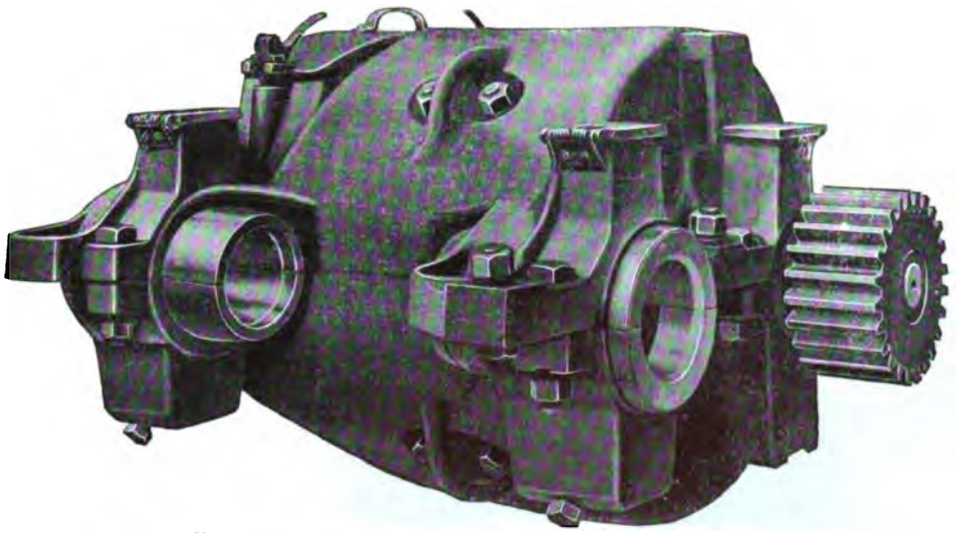


FIG. 4893. WESTINGHOUSE NO. 76. RAILWAY MOTOR.
WESTINGHOUSE ELECTRIC & MFG. CO.

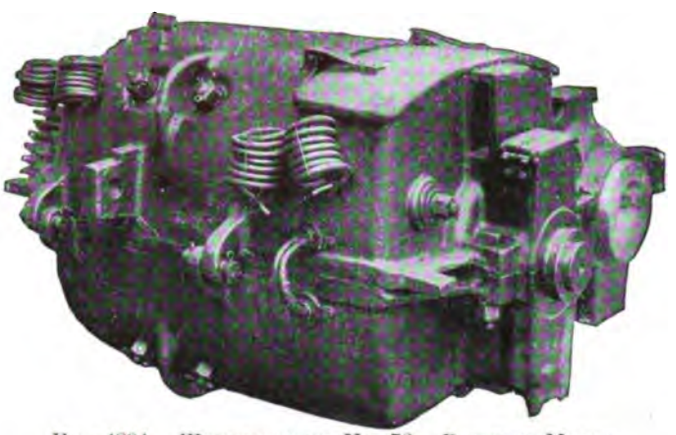


FIG. 4894. WESTINGHOUSE NO. 56. RAILWAY MOTOR.
WESTINGHOUSE ELECTRIC & MFG. CO.

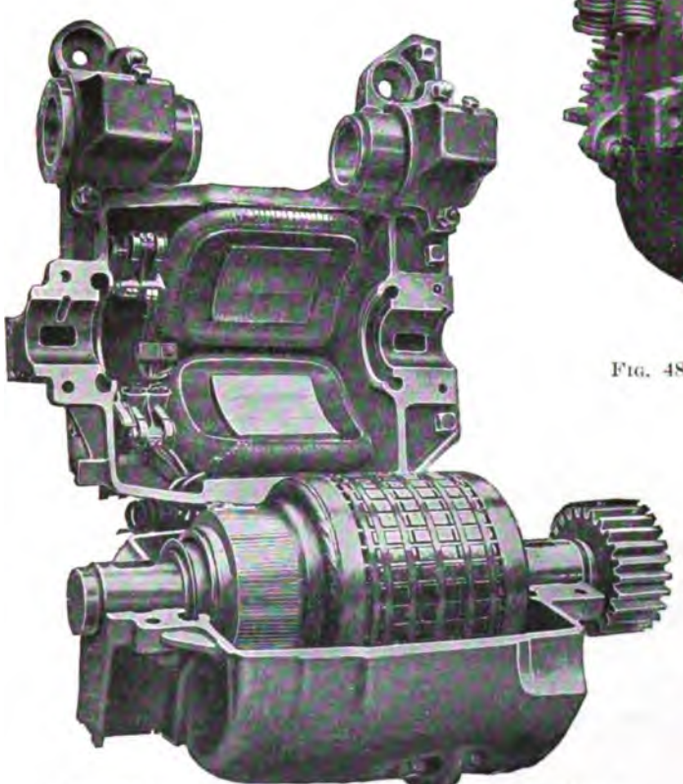
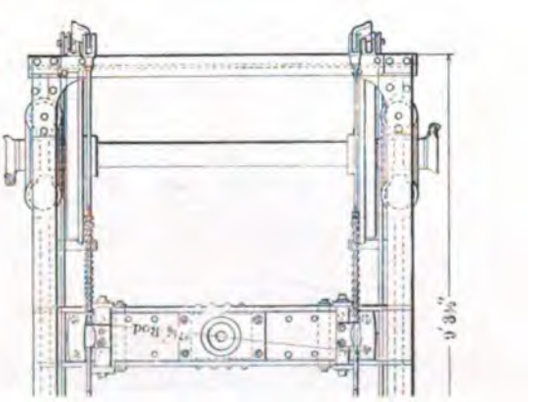
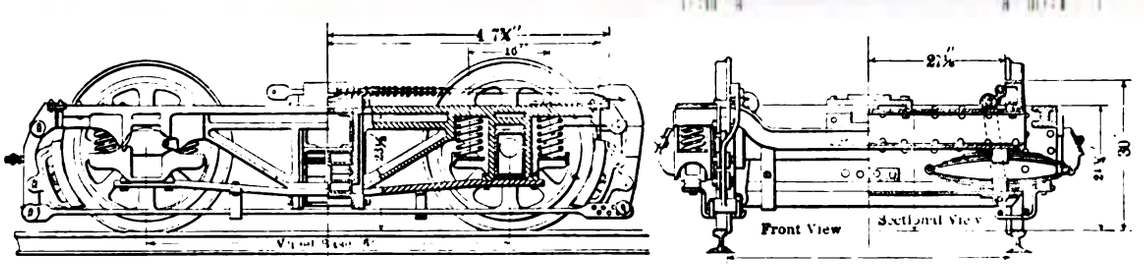
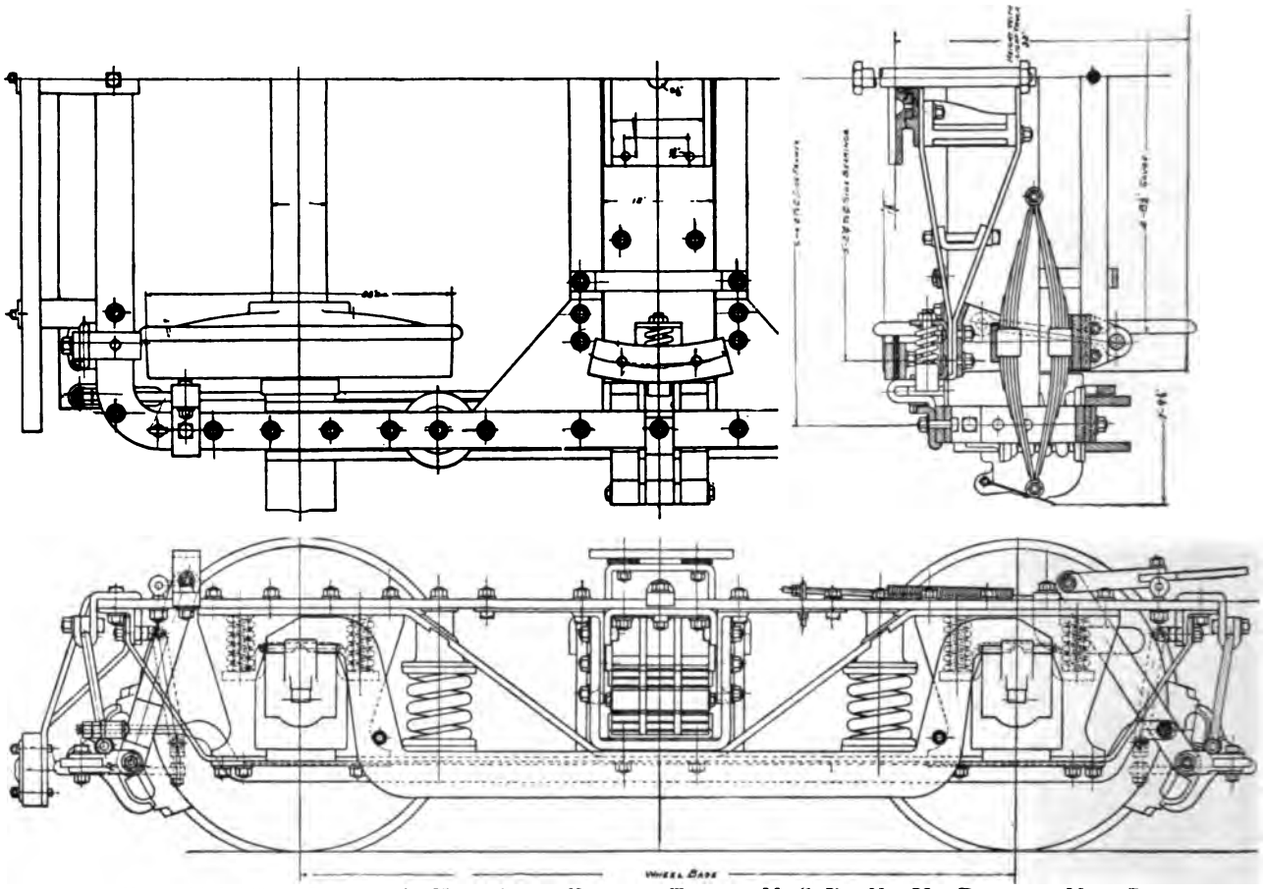


FIG. 4895. WESTINGHOUSE NO. 76. RAILWAY MOTOR WITH UPPER FIELD RAISED.
WESTINGHOUSE ELECTRIC & MFG. CO.

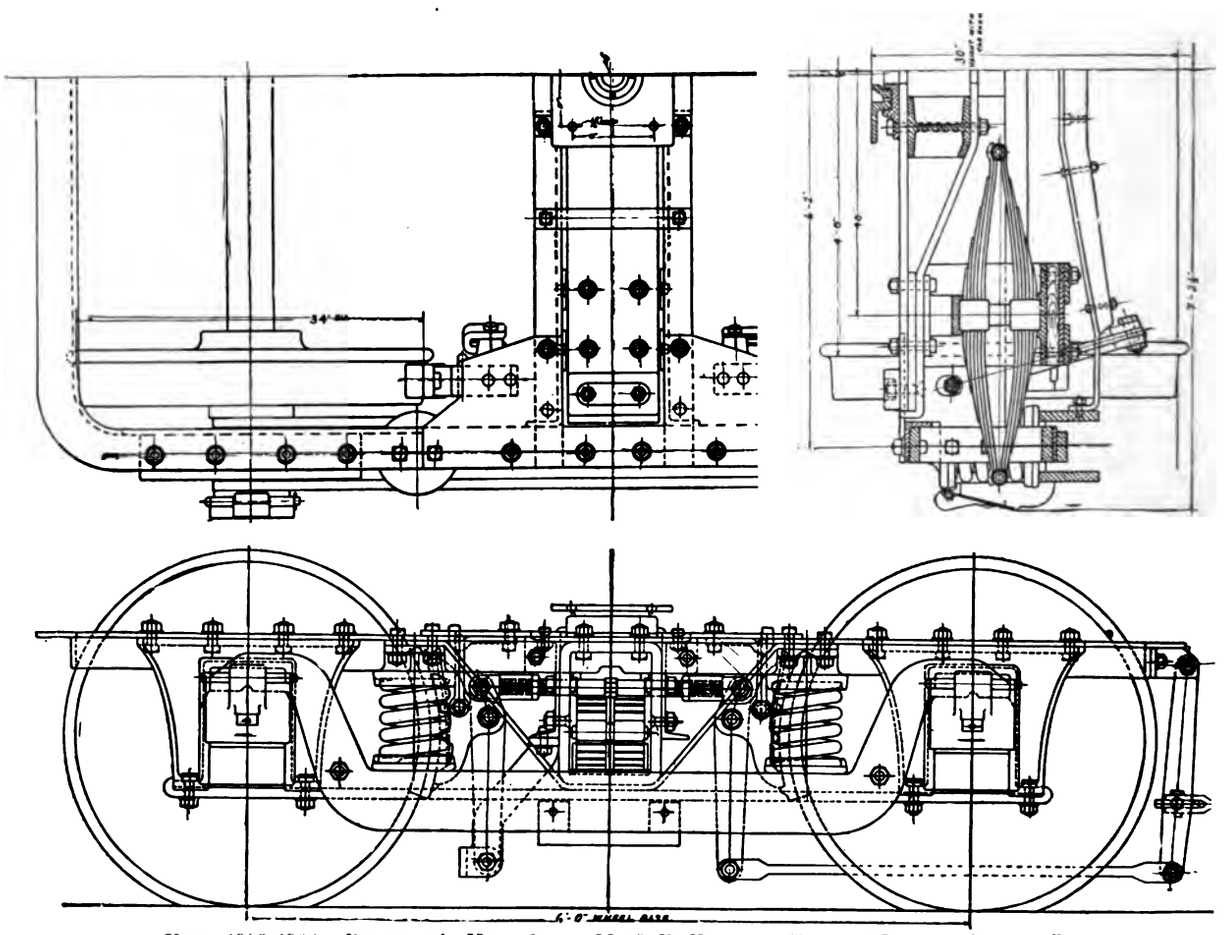




FIGS. 4896-4898. CAST STEEL TRUCK FOR ELEVATED OR THIRD RAIL SERVICE. HEDLEY PATENT.
ST. LOUIS CAR CO., MAKERS.



FIGS. 4899-4901. PECKHAM'S HIGH SPEED ELECTRIC TRUCK. M. C. B. No. 32. PECKHAM MFG. CO.



FIGS. 4902-4904. PECKHAM'S HIGH SPEED M. C. B. ELECTRIC TRUCK, "LONDON SPECIAL."
PECKHAM MFG. CO.

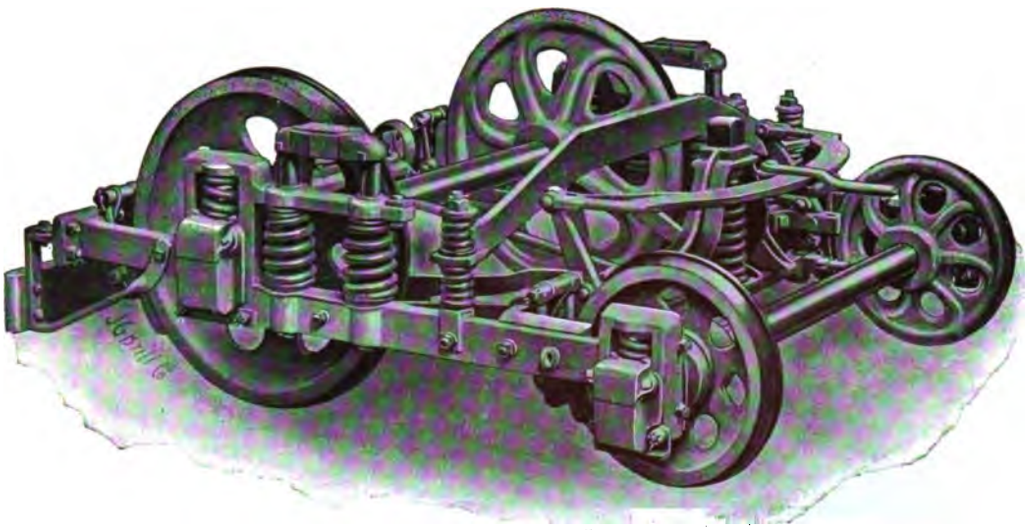
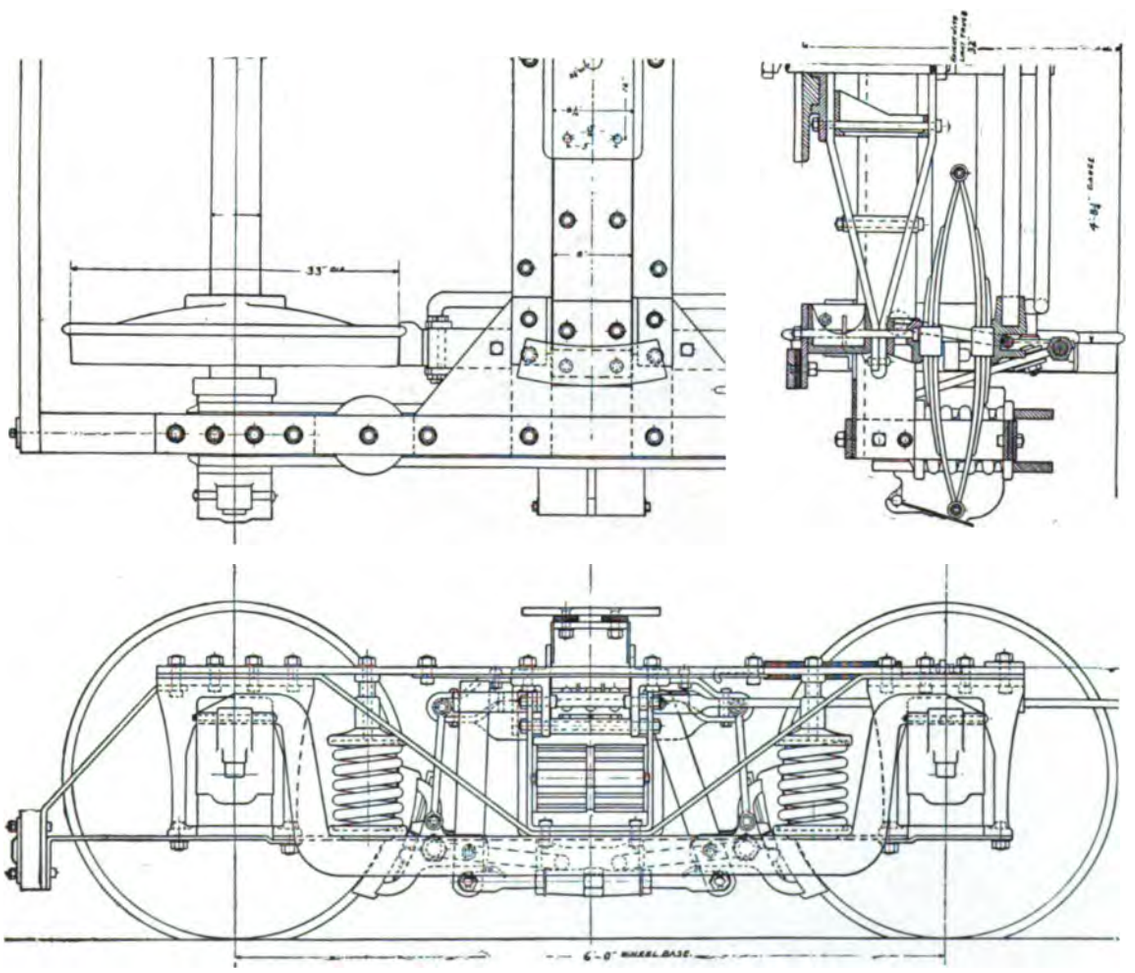


FIG. 4905. BRILL'S EUREKA MAXIMUM TRACTION TRUCK. J. G. BRILL CO.



FIGS. 4906-4908. PECKHAM'S HIGH SPEED ELECTRIC TRUCK. M. C. B. NO. 36. SHORT WHEEL BASE. PECKHAM MFG. CO.

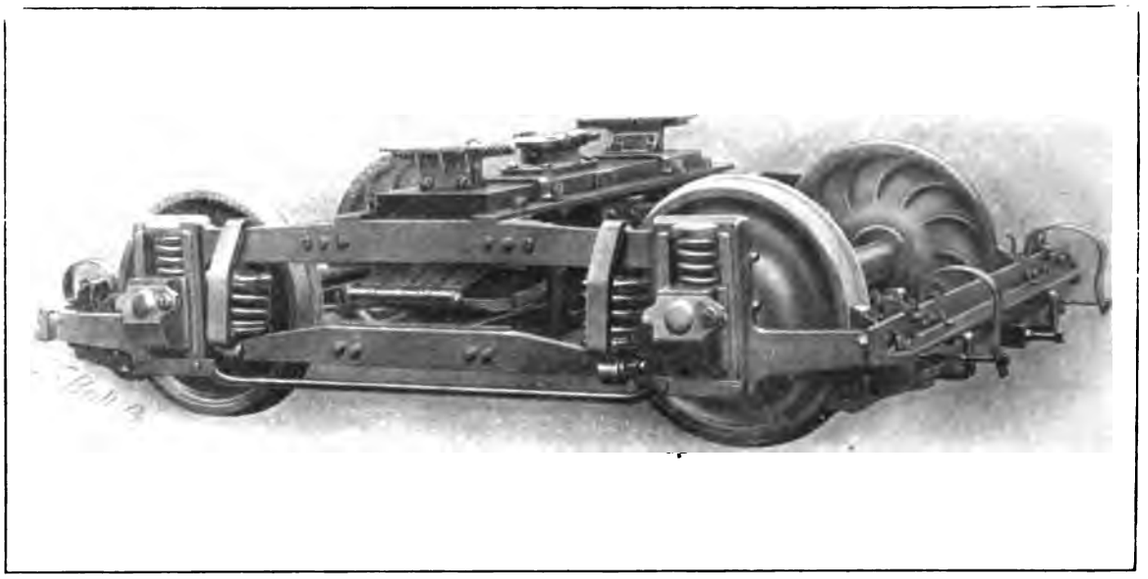


FIG. 4909. BRILL'S NO. 27 TRUCK, FOR STEAM OR ELECTRIC CARS.
J. G. BRILL CO.

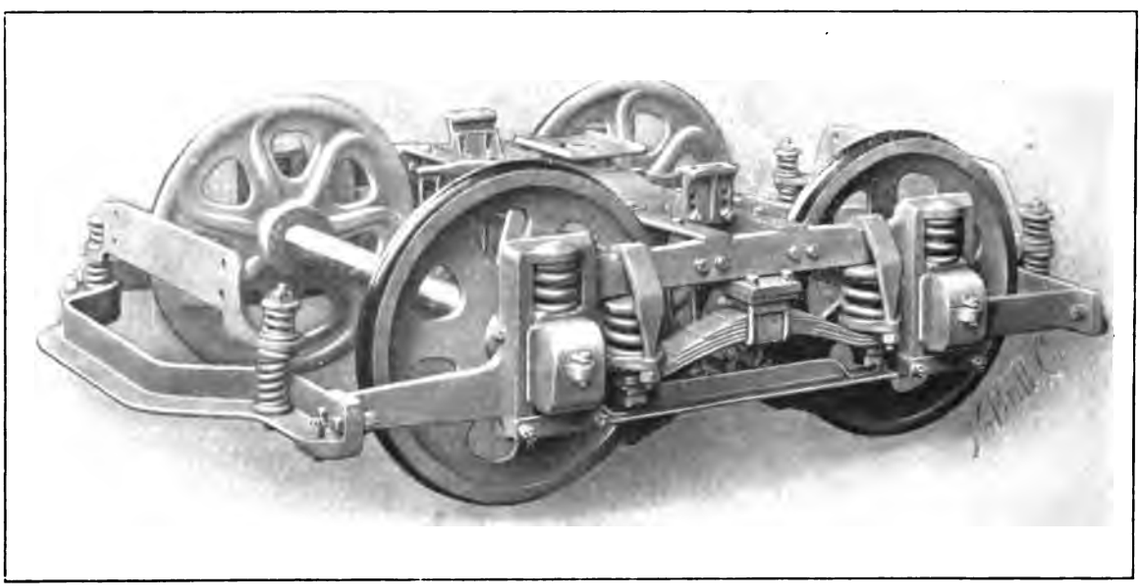


FIG. 4910. BRILL'S UNIVERSAL TRUCK NO. 27G. SHORT WHEEL BASE.
J. G. BRILL CO.

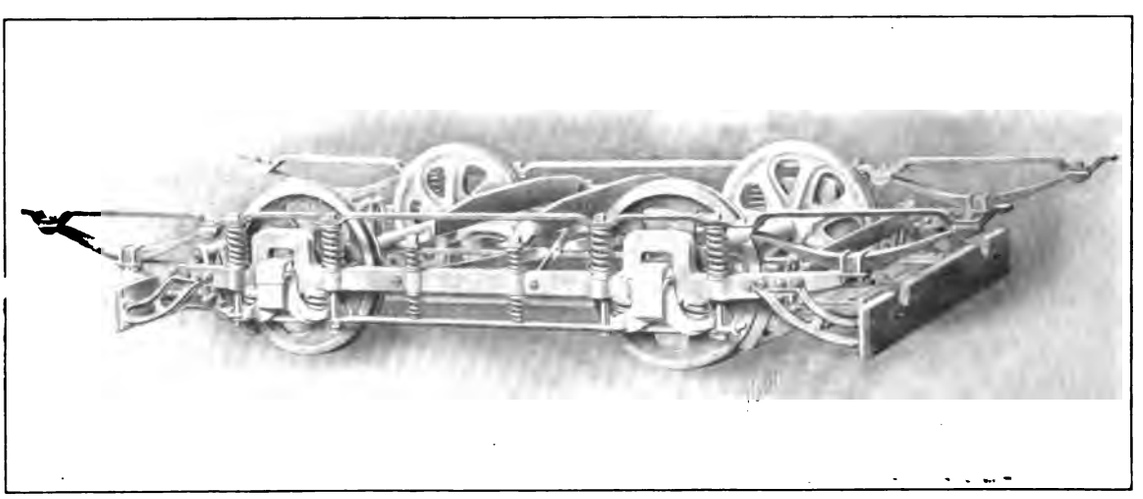


FIG. 4911. BRILL'S FOUR WHEEL TRUCK, NO. 21E.
J. G. BRILL CO.

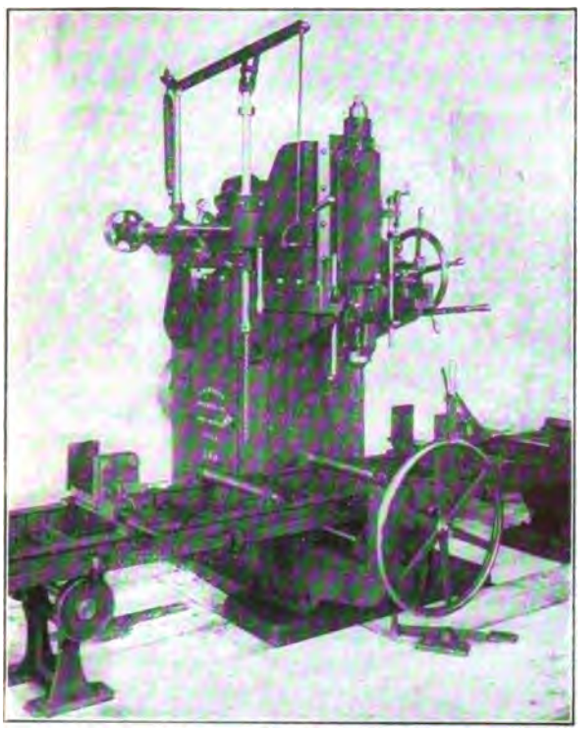


Fig. 4912. Vertical Hollow Chisel Mortiser. No. 300. S. A. Woods Machine Co.

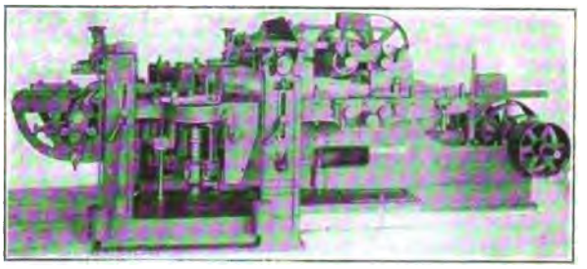


Fig. 4913. Straight Moulder. No. 128. S. A. Woods Machine Co.

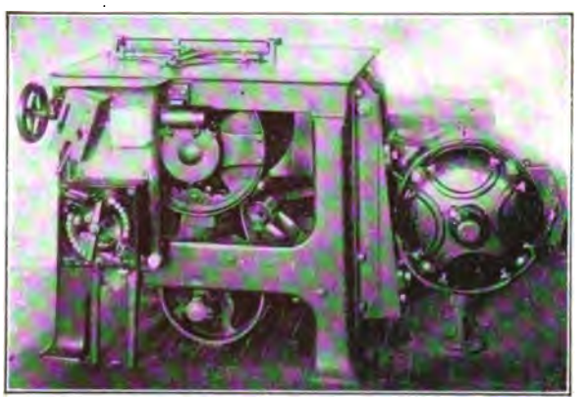


Fig. 4914. Circular Saw Belted to General Electric Co.'s CE4-3 h.p.-1200-500-Form B Motor. S. A. Woods Machine Co.

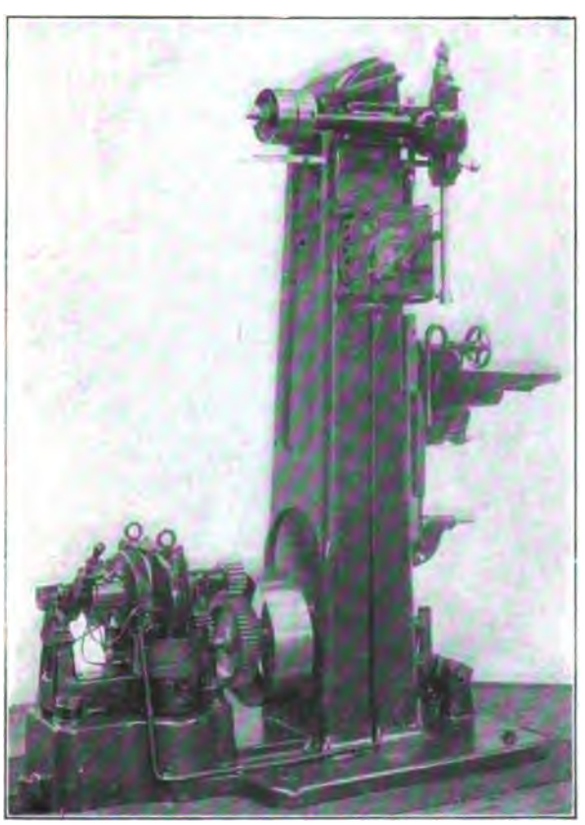


Fig. 4915. Mortiser and Borer. Fay & Egan Crocker-Wheeler 2 h.p. Shunt Motor Geared to Countershaft. 500 r.p.m.

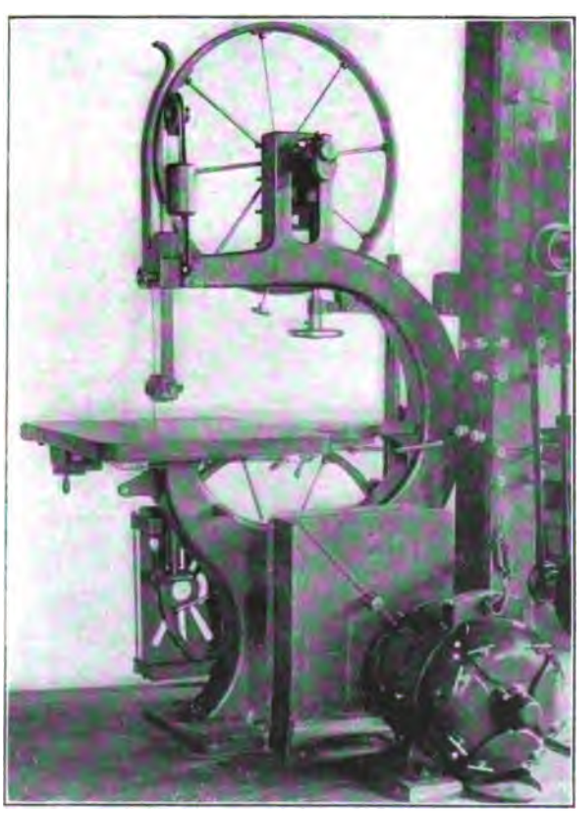


Fig. 4916. Band Saw. S. A. Woods Machine Co. Geared 3:1 to General Electric Co.'s CE4-3 h.p.-1200-500-Form A. C. W. Motor.

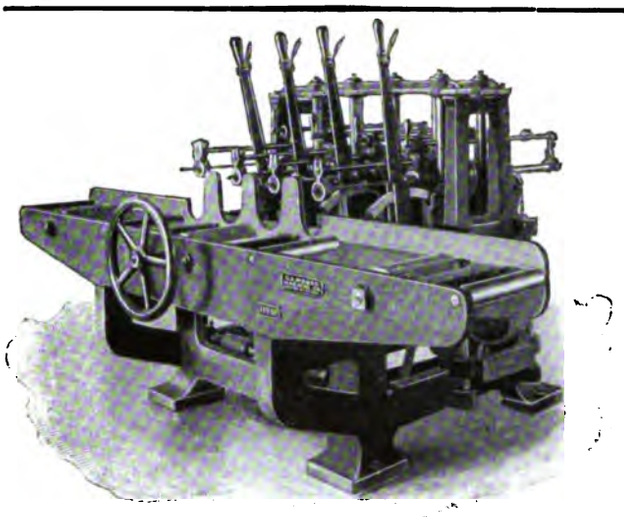


Fig. 4917. 4 Spindle Horizontal Boring Machine. No. 325.

Fig. 4918. Self Feeding Saw Table with Carrying-out Rolls. No. 153.

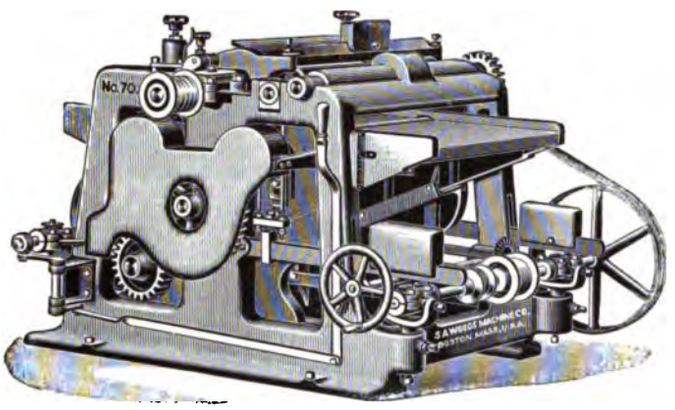


Fig. 4919. Cabinet Surface Planer, No. 70.

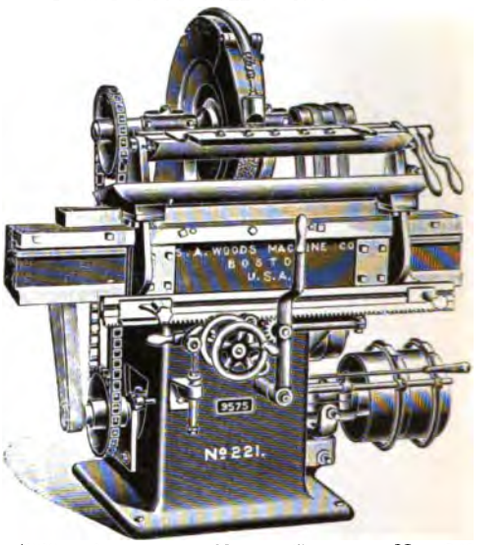


Fig. 4920. Automatic Knife Grinder, No. 221.

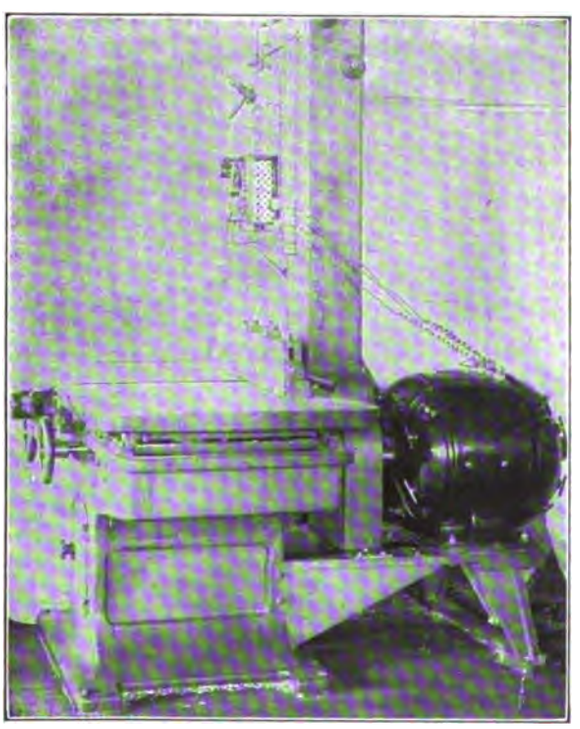


Fig. 4921. 24 in. Buzz Planer, Connected by Gears to General Electric Co.'s CE4-5 h.p. D. C. Motor, 120 r.p.m.

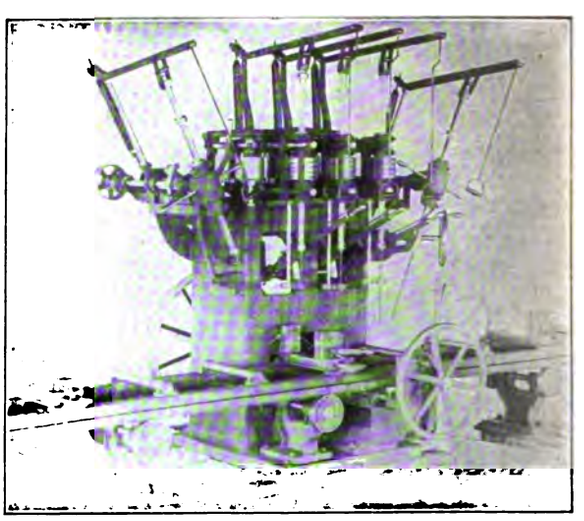


Fig. 4922. 6 Spindle Combination Boring Machine, No. 321.

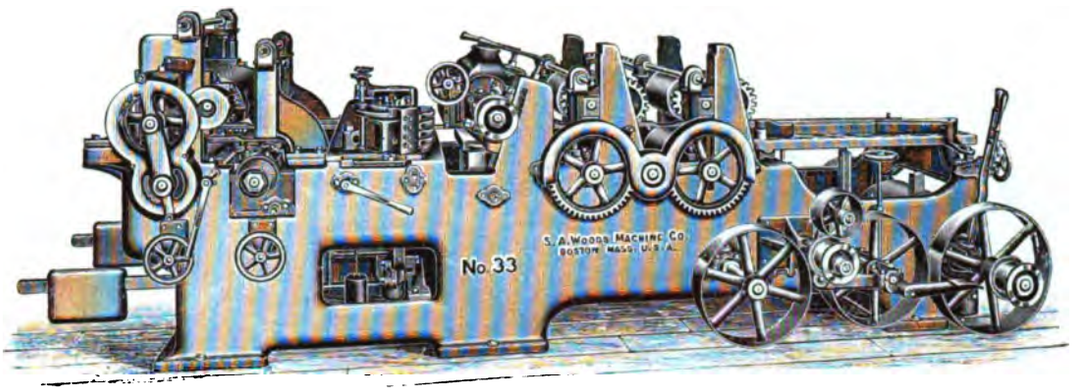


Fig. 4923. Four-Head Flooring Machine, No. 33.

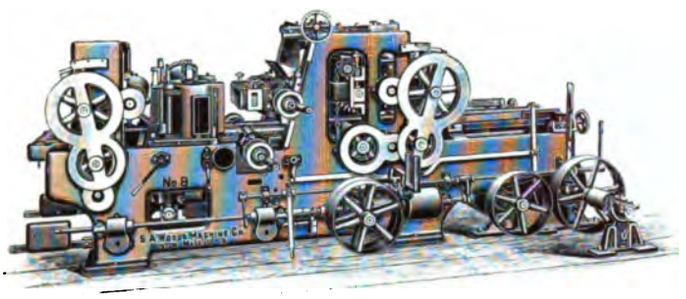


Fig. 4924. Car Sill Dresser or Timber Sizer, No. 8.

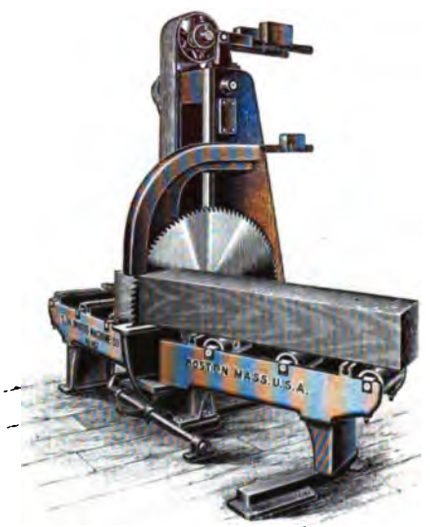


Fig. 4925. Automatic Vertical Cut Off Saw, No. 187.

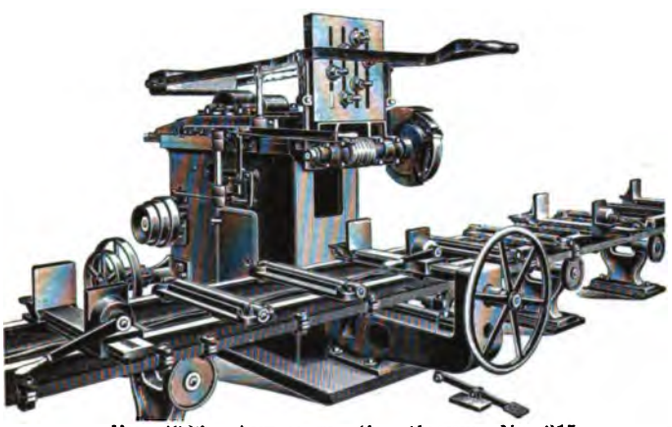


Fig. 4926. Automatic Car Gainer, No. 315.

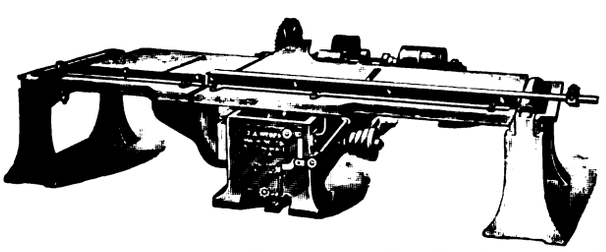


Fig. 4927. Automatic Horizontal Cut Off Saw, No. 188.

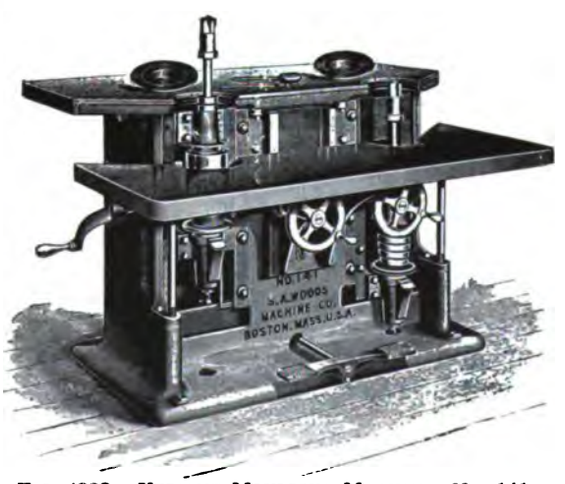


Fig. 4928. Upright Moulding Machine, No. 141.

FIG. 4929. UNIVERSAL SAW BENCH. No. 476.

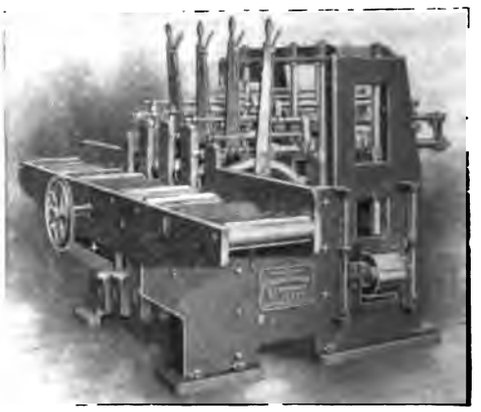


FIG. 4930. EXTRA RANGE HORIZONTAL CAR BORING MACHINE. No. 306.

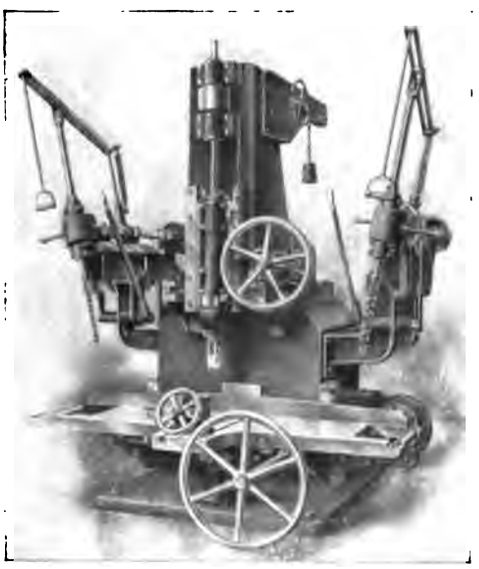


FIG. 4931. EXTRA RANGE VERTICAL HOLLOW CHISEL MORTISER. No. 15.

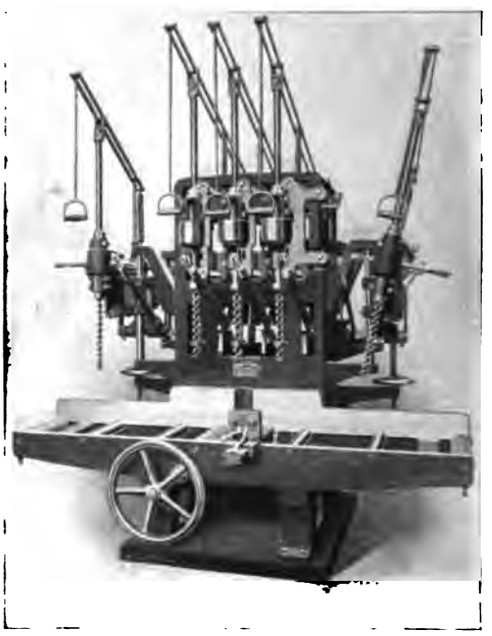


FIG. 4932. HEAVY VERTICAL AND RADIAL CAR BORING MACHINE. No. 327.

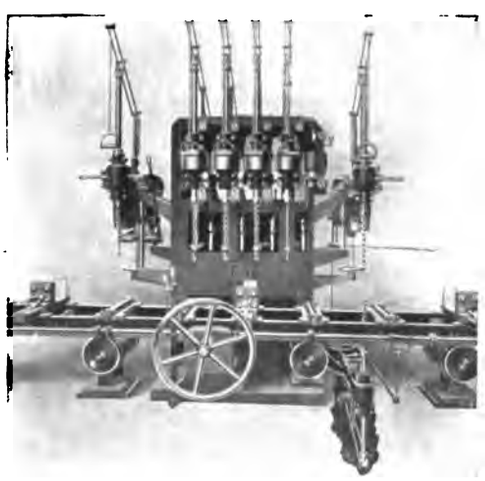


FIG. 4933. HEAVY CAR SILL AND SIDE PLANK BORING MACHINE. No. 342.

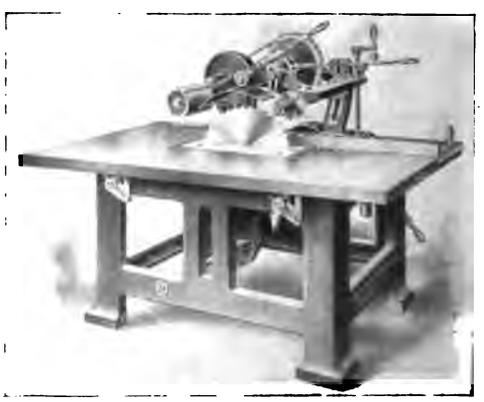


FIG. 4934. SELF FEEDING RIP SAW TABLE No. 2.

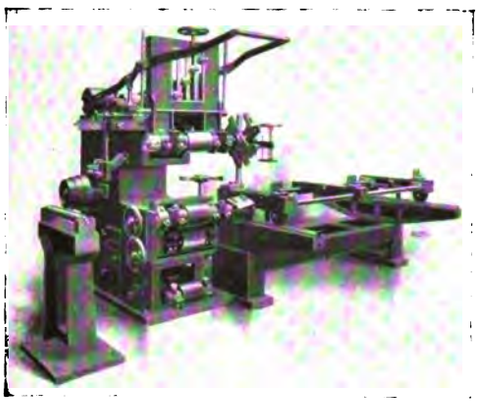


FIG. 4935. COMBINED AUTOMATIC CAR GAINER AND HORIZONTAL TENONER. NO. 528.

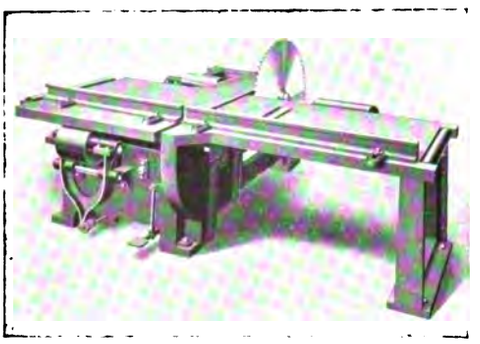


FIG. 4936. AUTOMATIC CUT OFF SAW. NO. 3.

FIG. 4937. 16-IN. VARIETY WOODWORKER. NO. 575.

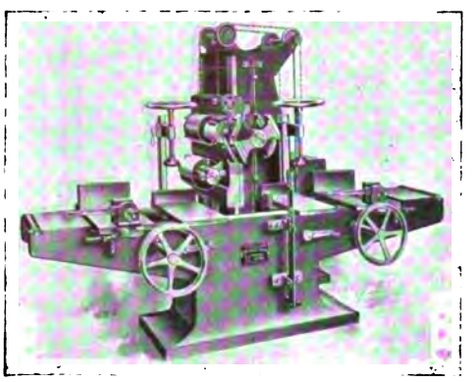
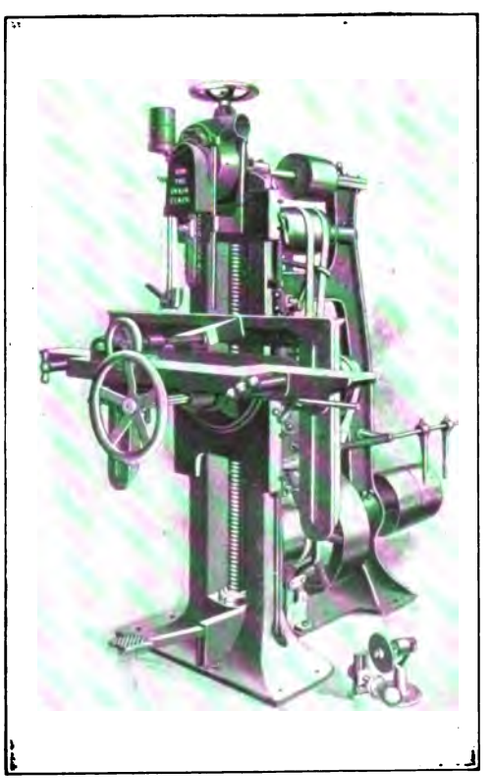


FIG. 4938. AUTOMATIC VERTICAL CAR SILL TENONING MACHINE. NO. 4.

FIG. 4939. EXTRA RANGE HORIZONTAL HOLLOW CHISEL MORTISER. NO. 8.



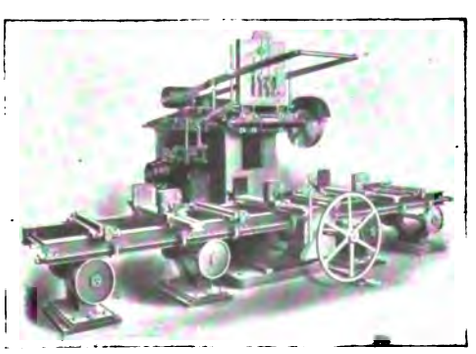


FIG. 4940. EXTRA RANGE AUTOMATIC CAR GAINING MACHINE. NO. 3.

FIG. 4941. CHAIN SAW MORTISING MACHINE. NO. 2. NEW BRITAIN MACHINE CO.

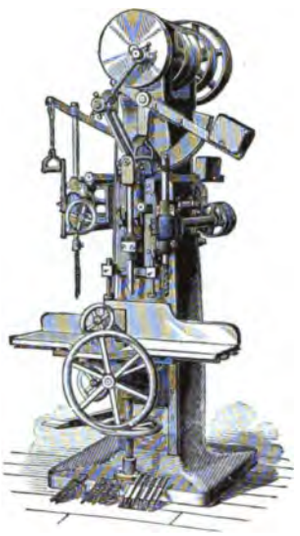


FIG. 4942.
NO. 6 CAR MORTISER AND BORER.

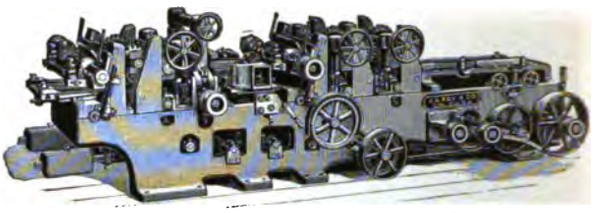


FIG. 4943. NO. 17. SIX-ROLL TRIPLE CYLINDER FLOORING MACHINE.

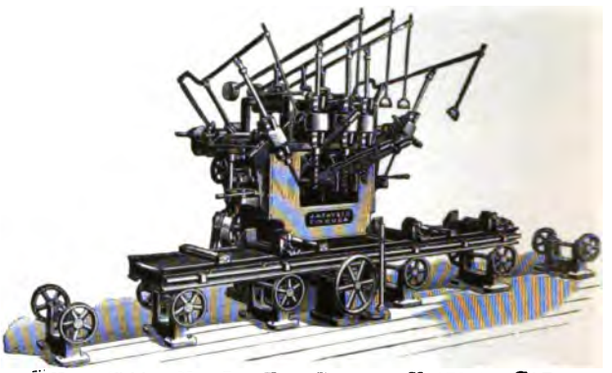


FIG. 4944. NO. 5. FIVE-SPINDLE VERTICAL CAR BORING MACHINE.

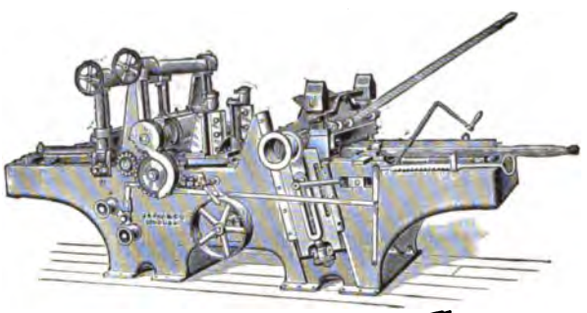


FIG. 4945. HEAVY CAR SILL AND TIMBER DRESSING MACHINE. NO. 1.

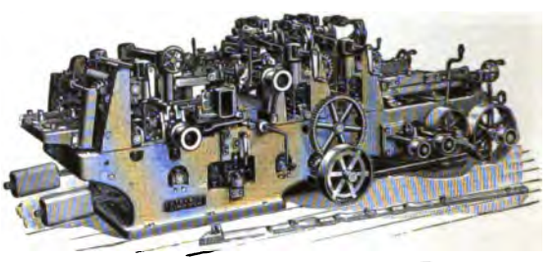


FIG. 4946. NO. 16. EXTRA HEAVY DOUBLE CYLINDER PLANER AND MATCHER.

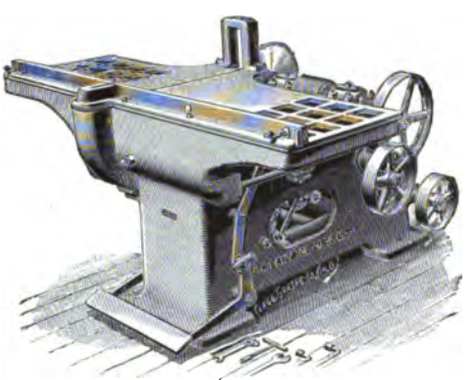


FIG. 4947. NO. 2. AUTOMATIC RAILWAY CUT-OFF SAW.

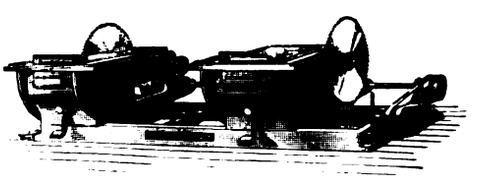


FIG. 4948. NO. 3. AUTOMATIC DOUBLE CUTTING-OFF MACHINE.

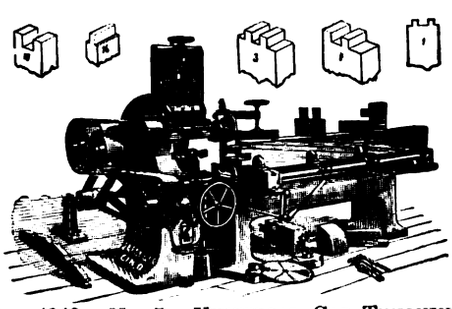


FIG. 4949. NO. 5. UNIVERSAL CAR TENONING AND GAINING MACHINE.

FIG. 4950.
SWING CUT-OFF SAW.

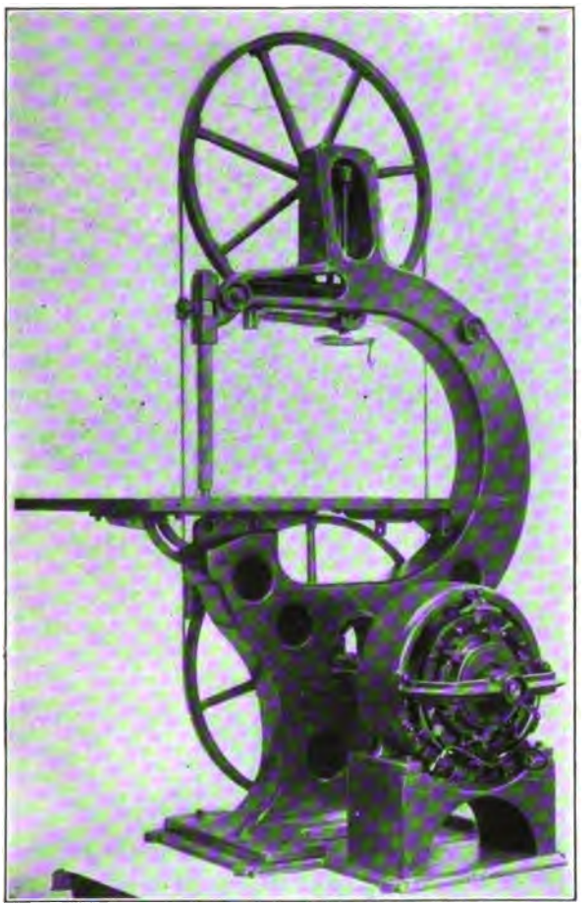


FIG. 4951.
No. 00 BAND SAW. GEARED TO CROCKER-WHEELER SHUNT WOUND ENCLOSED MOTOR, 5 H.-P.

FIG. 4952.
No. 87. EXTRA HEAVY DOUBLE SPINDLE SHAPER.

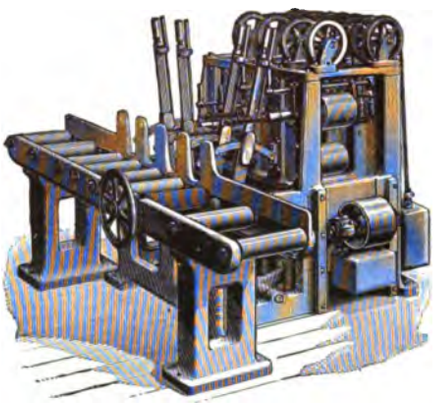


FIG. 4953.
No. 6. FOUR-SPINDLE HORIZONTAL CAR BORING MACHINE.

WOOD WORKING MACHINERY. J. A. FAY & EGAN.

TABLE OF POWER REQUIRED TO DRIVE WOODWORKING MACHINES BY ELECTRIC MOTOR.

Data Compiled From Actual Installations Made by The Crocker-Wheeler Co.

Type of Machine.	Makers' Number.	Maker.	Will Take Stock.	Horse Power of Motor to Drive.	Type of Motor Recommended.	Connection Between Motor and Machine.	Counter Shaft or Motor Speed R. P. M.
Dimension Planer	32	Fay & Egan.	24 in. x 24 in.	20	Enclosed Shunt Wound.	Belted to Counter Shaft.	900
Double Cylinder Planer	18	Fay & Egan.	30 in. x 8 in.	20	Enclosed Shunt Wound.	Belted to Counter Shaft.	
6 Roll Double Surfacer	51	S. A. Woods.	30 in. x 12 in.	17½	Shunt Wound.	Coupled to Counter Shaft	900
Pony Planer		Am. Wd. Wk. Mach. Co.	24 in. x 6 in.	3	Enclosed Shunt Wound.	Belted to Counter Shaft.	
Planer and Jointer	1	Fay & Egan.		3	Enclosed Shunt Wound.	Geared to Cutter Head	6,000
Outside Moulding Machine	128	S. A. Woods.	13 in. x 6 in.	22½	Shunt Wound.	Coupled to Driving Shaft	950
6 in. 4 Side Moulding Machine.	2	Fay & Egan.	6 in. x 3½ in.	8	Enclosed Shunt Wound.	Belted to Counter Shaft.	900
Single Surfacer	93	S. A. Woods.	24 in. x 6 in.	13	Shunt Wound.	Belted to Counter Shaft.	1,100
Wood Worker	2	Fay & Egan.		5	Semi-Enc. Shunt Wound.	Belted to Driving Shaft.	
Double Panel Raiser		Fay & Egan.	Raises up to 5 in.	7½	Enclosed Shunt Wound.	Belted to Driving Shaft.	
Self Feed Rip Saw	2½	Fay & Egan.	22 in. Saw.	15	Shunt Wound.	Belted to Counter Shaft.	
Rip Saw	153	S. A. Woods.	24 in. Saw.	25	Shunt Wound.	Belted to Saw Arbor	750
Auto. Ry. Cut-off Saw	2	Fay & Egan.	20 in. Saw.	10	Semi-Enclosed.	Geared to Counter Shaft.	
Saw and Dado Machine	5	Fay & Egan.	14 in. Saw. 17x3¼ in.	8	Shunt Wound.	Belted to Counter Shaft.	
Tenoning Machine	3½	Fay & Egan.	Medium Size.	8	Enclosed Shunt Wound.	Coupled to Counter Shaft	
Automatic Car Gainer	315	S. A. Woods.	24 in. x 20 in.	15	Compound Wound.	Coupled to Counter Shaft	500
Hollow Chisel Mortiser	305	S. A. Woods.	12 in. x 14 in.	15	Shunt Wound.	Coupled to Counter Shaft	800
Mortiser and Borer	71	Fay & Egan.	Mortise, 4½ in. deep.	2	Shunt Wound.	Geared to Counter Shaft.	500
Blind Stile Mortiser and Borer.		Fay & Egan.	Mortise, 2¼ in. deep.	3	Shunt Wound.	Belted to Counter Shaft.	
Band Saw	00	Fay & Egan.	34 in. x 28 in. Table	5	Semi-Enc. Shunt Wound.	Geared to Machine.	
Band Re-Saw	182	S. A. Woods.	8 in. x 13 in.	8	Shunt Wound.	Coupled to Driving Shaft	600
Band Re-Saw	36	Fay & Egan.	36 in. x 20 in.	30.	Shunt Wound.	Geared to Machine.	500
Scroll Band Saw	00	Fay & Egan.	36 in. Wheels.	2		Direct Connected.	
Scroll Saw	6	Fay & Egan.	32 in. x 38 in. Table.	1	Shunt Wound.	Belted to Crank Shaft.	1,400
Universal Boring Machine	52	Fay & Egan.	20 in. Stroke.	3	Enclosed Shunt Wound.	Belted to Machine.	375
Car Boring Machine	321	S. A. Woods.	12 in. x 14 in.	7½	Shunt Wound.	Geared to Counter Shaft.	875
Post Drill			42 in. x 7 in.	2	Enclosed Shunt Wound.	Belted to Counter Shaft.	
16 in. Wood Lathe		Fay & Egan.	16 in. Swing.	2	Shunt Wound.	Geared to Spindle.	
Box Joint Machine			12 in. x 1 in.	10	Enclosed Shunt Wound.	Belted to Counter Shaft.	
Auto. Knife Grinder	2	Fay & Egan	32 in. long.	2	Enclosed Shunt Wound.	Geared to Counter Shaft.	350
Upright Moulding Machine	141	S. A. Woods.	40 in. x 56 in. Table.	9½	Shunt Wound.	Coupled to Counter Shaft	1,100
Single Spindle Friezer or Shaper.	8	Fay & Egan.		2	Shunt Wound.	Geared to Friction Clutch	700

FIG. 4954. AJAX FORGING AND UPSETTING MACHINE.
AJAX MFG. CO.

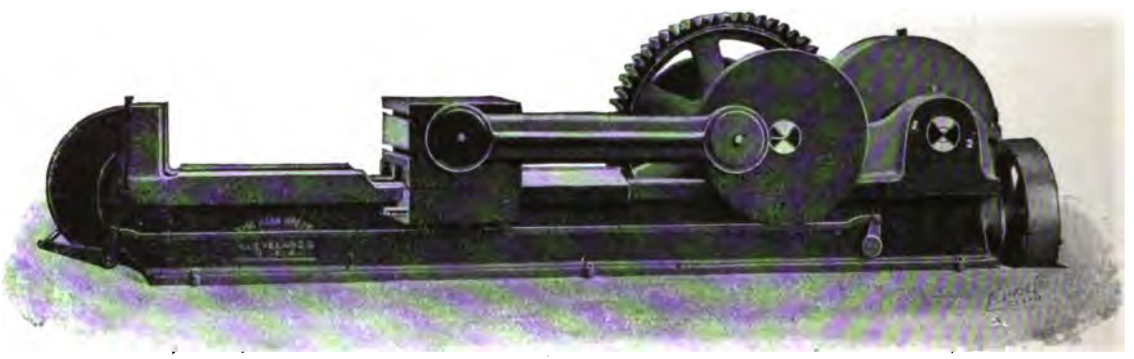


FIG. 4955. AJAX BULLDOZER.
AJAX MFG. CO.

FIG. 4956. MONARCH DRILL, NO. 3, FOR WOOD BORING.

FIG. 4957. PNEUMATIC DRILL, No. 1.

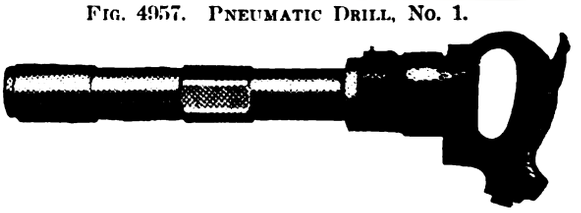


FIG. 4958. PNEUMATIC RIVETING HAMMER, No. 6.
STANDARD RAILWAY EQUIPMENT CO., MAKERS.

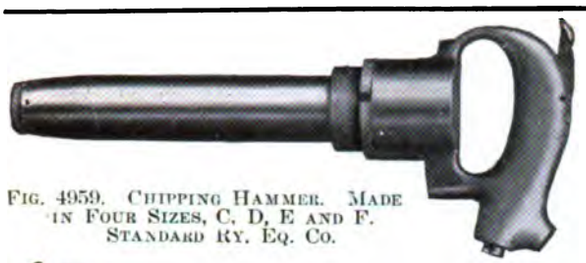


FIG. 4959. CHIPPING HAMMER. MADE IN FOUR SIZES, C, D, E AND F. STANDARD RY. EQ. CO.

FIG. 4960. KELLER PNEUMATIC RIVETING HAMMER. PHILADELPHIA PNEUMATIC TOOL CO.

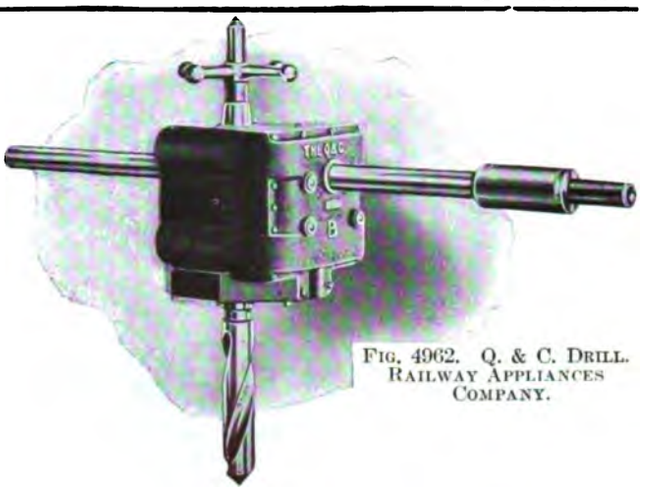


FIG. 4962. Q. & C. DRILL. RAILWAY APPLIANCES COMPANY.

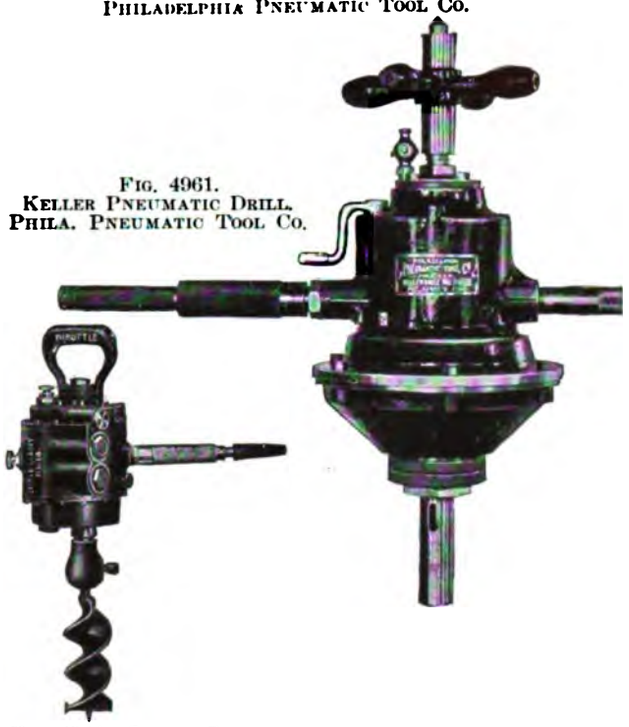


FIG. 4961. KELLER PNEUMATIC DRILL. PHILA. PNEUMATIC TOOL CO.

FIG. 4963. Q. & C. DRILL WITH ATTACHMENTS. RAILWAY APPLIANCES CO.

FIG. 4964. LITTLE GIANT REVERSIBLE WOOD BORING MACHINE.

FIG. 4966. PNEUMATIC PAINTING MACHINE.

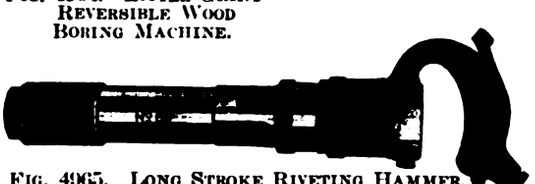
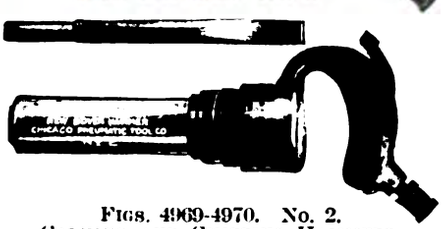


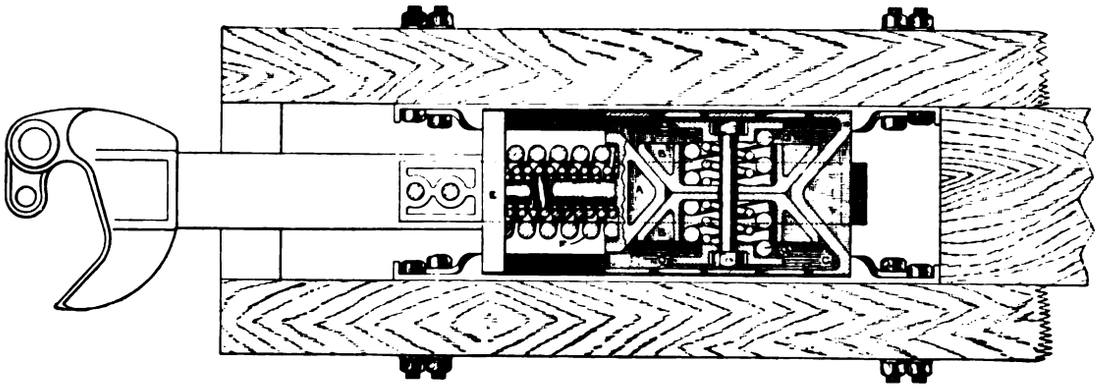
FIG. 4965. LONG STROKE RIVETING HAMMER. NO. 80.

FIGS. 4967-4968. No. 1.

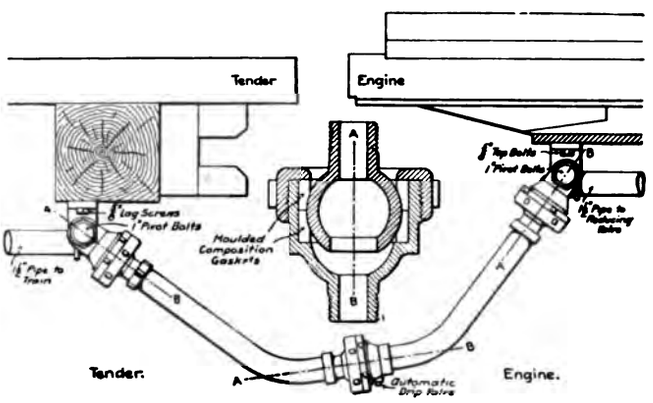


FIGS. 4969-4970. No. 2. CALKING AND CHIPPING HAMMERS.

FIG. 4971. LITTLE GIANT PISTON AIR DRILL, No. 2



REPUBLIC FRICTION DRAFT GEAR. REPUBLIC RAILWAY APPLIANCE CO.



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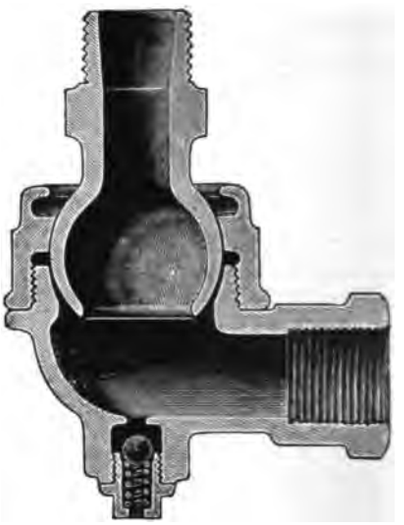
THE HOLLAND CO., MAKER.



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12,000 Cars

Equipped during two years
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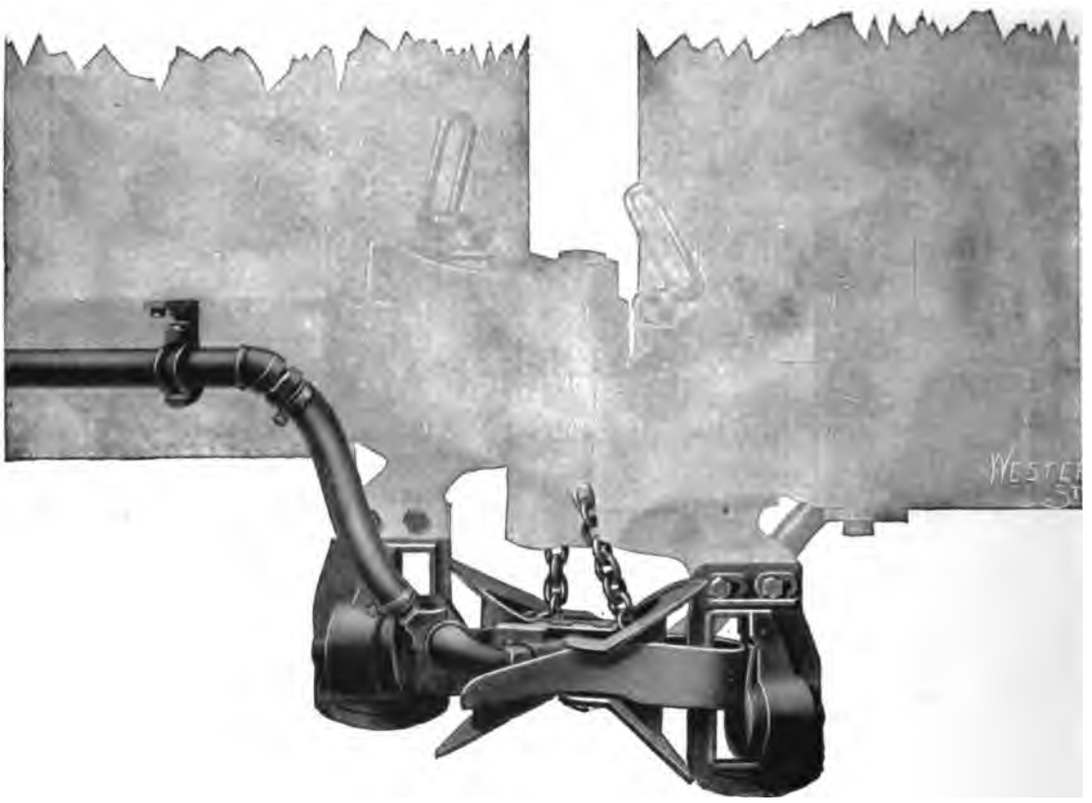

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Combined Magnetic Brake
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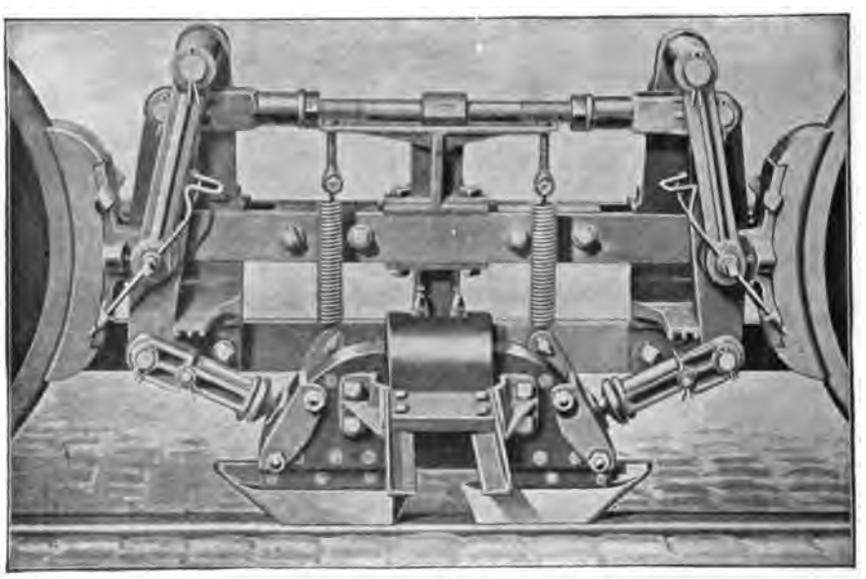

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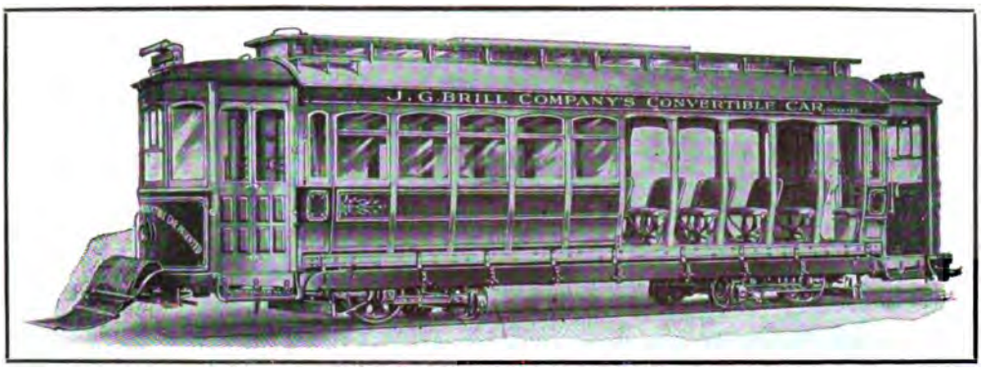

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The modern and economical method of operating a metal or wood working shop is motor drive with a proper grouping of constant speed tools and individual motors on those machines requiring a range of speeds. Our equipments include a system of control for the latter, which is simple, practical and highly efficient, increasing and improving the output of every tool.

Crocker-Wheeler apparatus is known for the accuracy and efficiency of its design, the strength of its construction and its ability to repeatedly carry heavy overloads.

Sales Offices in all Large Cities

GENERAL ELECTRIC COMPANY'S

GENERAL ELECTRIC 3 H.-P. CE MOTOR
Operating Band Saw

Motor Equipment for Machine Shops

BY means of electric motors, railroad repair shops may be run under conditions of maximum economy in the expenditure of power, and of greatest convenience for beginning work at any moment.

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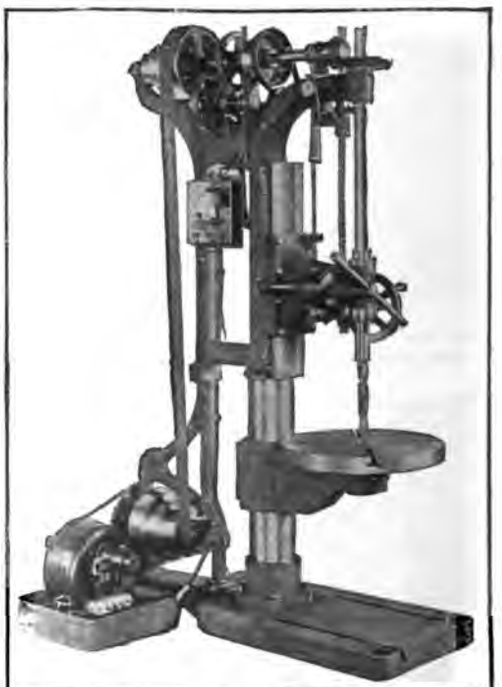
Chicago Office, Monadnock Block
St. Louis Office, Wainwright Building
San Francisco Office, Claus Spreckles Building
Los Angeles Office, Douglas Building

SALES OFFICES IN ALL LARGE CITIES.



GENERAL ELECTRIC CA MOTOR
Operating Drill Press

C. A. STARBUCK, President. J. C. THOMPSON, Sec.-Treas.

THE NEW YORK AIR BRAKE CO.

NEW YORK AIR BRAKES ARE THE PRODUCT OF LARGE AND WELL-APPOINTED PLANTS AND ARE MADE OF THE VERY

BEST MATERIALS.

THEY ARE IN CONSTANT USE ON MANY THOUSAND FREIGHT CARS, LOCOMOTIVES AND PASSENGER CARS, AND

INTERCHANGE PERFECTLY

UNDER ALL CONDITIONS OF SERVICE. THEY ARE DURABLE, EFFICIENT AND SATISFACTORY IN EVERY WAY.

COST LESS THAN OTHERS

AND HAVE BEEN ADOPTED BY SOME OF THE MOST PROMINENT RAILWAYS IN THE WORLD.

THE NEW YORK AIR BRAKE CO.

GENERAL OFFICES:
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WORKS:
WATERTOWN, N. Y., and
LUBERTZY, RUSSIA.

American Car & Foundry Company

BUILDERS OF EVERY CLASS OF PASSENGER AND FREIGHT TRAIN CARS

Coaches, Sleepers, Chair, Cafe, Dining, Combination, Mail, Baggage and Express Cars, Wooden Freight Cars, Structural Steel Freight Cars, Composite Freight Cars, Steel Underframing for Freight Cars. Exclusive Builders of the Canda Car.

ALSO ALL TYPES OF CARS FOR LOGGING RAILROADS AND MINES

Combined Capacity 100,000 Cars per annum. Additional Capacity for Car Wheels, Axles, Bar Iron, Forgings, Castings and Water, Gas and Culvert Pipe of all Descriptions.

ALL STYLES AND SIZES OF CHILLED WHEELS FOR STREET RAILROADS

EXCLUSIVE MANUFACTURERS OF THE

COMMON SENSE BOLSTERS

SUITABLE FOR 30, 40 OR 50 TONS CAPACITY CARS

Common Sense Transom and Truck Bolsters will be guaranteed to give equal or better service than any other type of built-up Transom or Truck Bolster manufactured.

ALSO EXCLUSIVE MANUFACTURERS OF THE

SOLID ROLLED STEEL CAR WHEEL

THE ONLY SOLID ROLLED, LOW PRICE STEEL WHEEL FOR RAILWAY, ELECTRIC AND STREET CAR SERVICE

The tire is developed from the rim of a solid wheel blank by action of driven rolls, which embrace it on all sides, condensing and working the steel to the required form. Being an integral part of the wheel, it cannot loosen from the heating action of the brakes, and can safely be worn or turn down much thinner than the tire of any built up wheel.

Many of the *original* "SOLID ROLLED STEEL WHEELS" now running under passenger cars have been in continuous service for the past twelve years. The price of this wheel is much less than that of any composite steel-tired wheel of equal diameter and service.

Estimates, Blue Prints and Specifications promptly furnished. ***Correspondence and Inquiries respectfully solicited.***

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TYPE PRESSED STEEL HOPPER. 50 TONS CAPACITY.

Maximum Load 110,000 Lbs. Dead Weight 38,500 Lbs. Ratio of Paying Load 74.07 Per Cent.

PRESSED STEEL CAR CO.

Designers and Builders of

Pressed Steel Freight Trucks, Engine Tender Trucks, Side Stakes,
Stake Pockets, Brake Beams, Center Plates, Corner Bands,
Body Bolsters, Truck Bolsters, and other

PRESSED STEEL SPECIALTIES

STEEL CARS

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with steel underframes

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ESTABLISHED 1849

THE BARNEY & SMITH CAR CO.

DAYTON——U. S. A.——OHIO

BUILDERS OF

ALL KINDS HIGH GRADE CARS

FOR

STEAM AND ELECTRIC SERVICE

OUR PRESENT FACILITIES ARE FAR SUPERIOR TO THOSE OF THE PAST FOR TURNING OUT PASSENGER AND FREIGHT WORK PROMPTLY.

20,000,000 FEET SEASONED LUMBER CONSTANTLY IN STOCK. 2,000 MEN EMPLOYED.

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ONE OF THE **I. C.** SPECIALS

Standard Steel Car Company.

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BUILDERS OF

Metal and Composite Freight Cars

FOR ALL CLASSES OF SERVICE.

Metal Car Underframes, Trucks and Bolsters, Brake Beams, Etc.

Designs and Specifications of Purchasers followed if desired.

CAPACITY, 18,000 CARS PER ANNUM.

Attention is invited to the Company's Standard Designs.

GOODWIN CAR CO.

96 Fifth Avenue, New York.
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ADDRESS ALL COMMUNICATIONS TO NEW YORK OFFICE

Controlling and Operating Patents for Dumping Cars, Vessels, Wagons, Barges, Bins, Trestles, Chutes and the like.

THE GOODWIN CAR

CARS LEASED ONLY

Trade Mark.

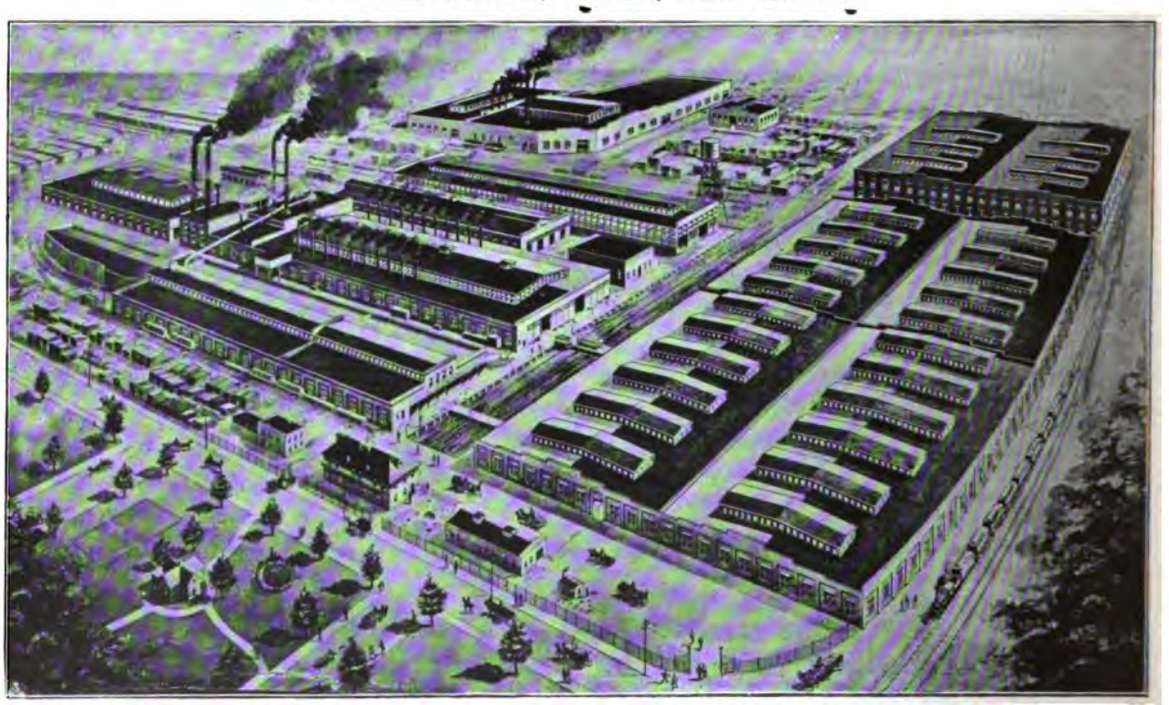
The ONLY UNIVERSAL UNLOADER and CARRIER of General way Freights and Merchandise as wel as DISTRIBUTOR of Dumpable Freights and SPREADER of Ballast.
Always ready for any of the different services without rearrangement or change of any part.

Steel construction combined with malleable iron, especially adapted for discharging Ore, Coke, Coal, Gravel, Large Rock, Broken Stone, Pig Iron, Castings, Machinery, Loose Grain, Steel Billets, Tin Plate Bars, Rail Ends, Hot Cinders, and many other similar materials by the gravity of the load alone without careening the car body.

Train of Goodwin Cars ballasting track outside of rail on one side with broken stone. Running four miles an hour.

ST. LOUIS CAR CO.,

ST. LOUIS, MO., U. S. A.



Builders of Passenger Cars and Trucks. All Types of Electric Cars and Trucks. High Speed Requirements a Specialty.

WALK-OVER TYPE CAR SEATS. Sole Manufacturers **SPIRAL JOURNAL BEARINGS.** Adapted for all Classes Railway Service.

Anderson-Smith System Electric Lighting. Arc Headlights. Arc Incandescent, Interior Lamps.

ESTABLISHED 1828

BOSTON BELTING CO.

James Bennett Forsyth, Gen. Mgr. *George H. Forsyth, Asst. Mgr.*

The trade-mark of excellence

EUREKA.
TRADE-MARK.

ENGINE AND TENDER CONNECTION HOSE

Cannot kink or collapse

HOSE for

Water, Steam, Gas, Air Brakes, Pneumatic Tools, Fire Protection, Suction etc.

Superior in Quality
Satisfactory in Service

Rubber Mats, Matting, Treads
for all classes of cars

When it's about Rubber ask us
BOSTON BELTING CO. BOSTON

Manufacturers of

GASKETS
VALVES

MECHANICAL

SPRINGS
DIAPHRAGMS

RUBBER GOODS

of every description for
Railway Service

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Scarritt Car Seats.

We make 75 STYLES, any wood, in

RATTAN, PLUSH or LEATHER

FOR

Coaches, Parlor and Chair Cars

FOR

STREET CARS

☞ Has Most Seating Room for Least Space Used.
☞ Can't Get Out of Order.
☞ Reversible and Tilting.
☞ Clean, Comfortable and Durable.
☞ They are "THE BEST" by Every Test.

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No. 59.—TWIN RECLINING CHAIR.

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THE NATIONAL CAR COUPLER CO.

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COUPLERS, STEEL PLATFORMS AND PLATFORM BUFFERS

STEEL CASTINGS

THE HINSON DRAFT RIGGINGS AND FRICTION BUFFERS

See Figures in this Publication

526 Monadnock, Chicago — 150 Broadway, New York

STEEL PLANT: CONVERSE, IND.

LEADING CAR SEATS OF THE WORLD

Highest Possible Grade of Springwork and Construction Throughout. Tested and Approved by many Years of Service. Simplest, Strongest, Most Durable and Comfortable Seats Made. Original in Design. Mechanically Correct.

Seats and Chairs for Passenger Coaches, Parlor and Sleeping Cars. Seats and Seating for Elevated, Underground or Surface Electric Railways.
Rattan Seat Covering (canvas lined).

No. 90. WALKOVER SEAT.
Standard Seat on the Pennsylvania Railroad System.

No. 178. REVERSIBLE SEAT.
Standard Seat on the Lehigh Valley, also Southern Ry.

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Standard Seat on Many Prominent Systems

SPECIFY HALE & KILBURN SEATS FOR YOUR CARS.

Catalogue and Description Furnished on Application.

Our seats are used almost universally on the Steam and Electric Railways of the United States, and also in many Foreign Countries.

THE HALE & KILBURN MFG. CO.

PHILADELPHIA **NEW YORK** **CHICAGO**

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SEE FIGURES 3778-3780—CAR BUILDERS' DICTIONARY

Gould Coupler Co.

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CHICAGO, The Rookery	Storage Battery,	" "
ST. LOUIS, 319 Commercial Buildings	Axle Forge,	" "
DEPEW, N. Y.	Cast Steel,	" "
	Malleable Iron,	" "
	Cast Steel,	Anderson, Ind.

For Descriptive Matter See Pages 231-232 Body of This Book

Catalogues and Blue Prints on Application

THE GOULD SYSTEM

—OF—

ELECTRIC CAR LIGHTING AND VENTILATION

Gould Storage Battery Co.

NEW YORK

STORAGE BATTERIES FOR CAR LIGHTING AND SIGNAL APPARATUS

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Pilot Buffers
Tender Buffers
Spring Buffer Blocks for freight cars
Vestibules, wide and narrow
Trap Door Rigging
Malleable Iron Draft Beams
Continuous Platforms and Buffers, wood and steel sills
Continuous Friction Buffers for steel or wood platforms
Friction Draft Gears for freight cars
Journal Boxes, Gould type
Roller Car Side Bearings
Malleable Iron Castings
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Locomotive and Car Axles, Iron and Steel

GOULD IMPROVED COUPLER

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WORKS

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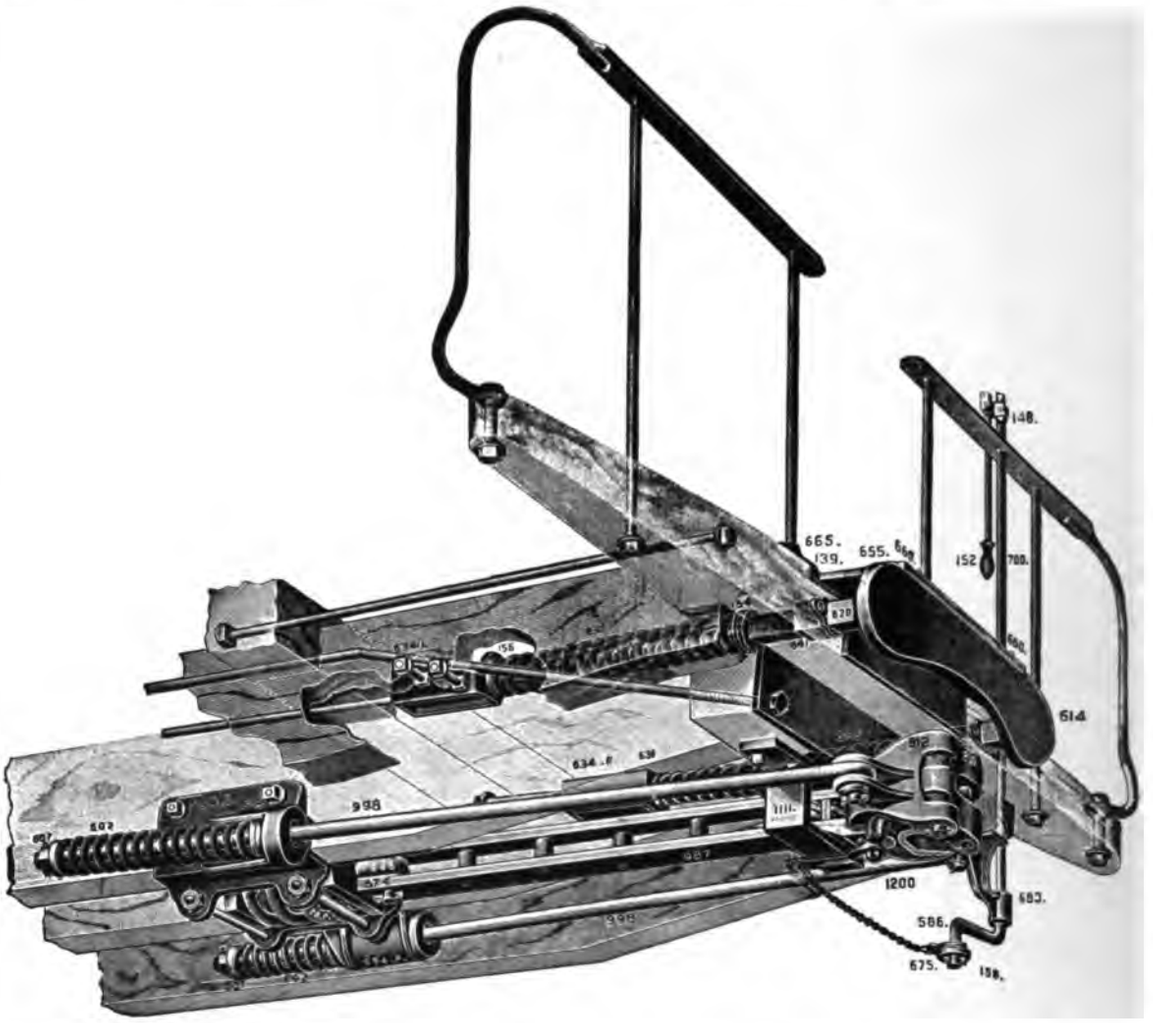
AXLE FORGE, -	DEPEW, N. Y.
CAST STEEL - -	DEPEW, N. Y.
MALLEABLE IRON,	DEPEW, N. Y.
CAST STEEL,	ANDERSON, IND.

FOR DESCRIPTIVE MATTER SEE PAGES 161, 165, 171, 177, 178, 179, 188, 307.

THE BUHOUP
3-STEM EQUIPMENT



THE LATEST and most approved design of equipment for passenger service. It has many advantages over a single stem coupler equipment, viz.:

Greater strength—three draft stems instead of one.

Greater spring resistance—three draft springs to each coupler instead of one.

Rotating head pivoted to the three stems which, with the side motion in the stirrup, relieves strain to platform on curves and flange wear of wheels.

Less lost motion in the coupler heads and greater spring pressure, eliminating excess side motion, and causing train to run more steadily than when equipped with single stem couplers.

Cheapest to apply as it can be adapted to any style of platform and applied with any style of draft timbers in the place of Miller or other couplers. It is also adapted for application with steel platforms, with which it is largely used. This equipment is in use extensively.

Manufactured Exclusively by

THE McCONWAY & TORLEY CO.

PITTSBURGH, PA.

THE KELSO COUPLER

THIS COUPLER has been designed to meet the most severe conditions of service. In it we have embodied all the good points of the Janney Coupler with the additional feature of a "lock-set," which makes it unnecessary to lock up the uncoupling lever by means of a special bracket on the end sill, as in former practice, or to hold up the uncoupling lever by hand in order to effect a "cut-off" of cars. With this coupler, the trainman to make a "cut" simply raises the uncoupling lever to the unlocking point, and then permits it to drop to normal position. The coupler does the rest—the "lock-set" holding the lock in the uncoupled position until the cars in parting open the knuckle. With the opening of the knuckle, the lock is automatically dropped to a coupling position ready for coupling up on impact. A reliable and effective "lock-set" is the most desirable feature in a M. C. B. Coupler, since it is the member of the device which is utilized every time a coupler is operated for cutting off a car, and upon its effective operation depends not only the rapidity with which such work can be performed, but also the minimum of labor for such performance. The Kelso "lock-set" is positive in action and effective. It will not drop the lock to the coupling position until the knuckle has opened 80% of its total outward movement. It cannot, therefore, be rattled or shaken down by a slight movement of the knuckle resulting from the cars passing over frogs and switches.

The same member which acts as a "lock-set" in the uncoupled position, also acts as a "lock-to-the-lock" when coupled, performing a double function. As a "lock-to-the-lock" it is positive in action, eliminating any possibility of accidental uncoupling from a creeping up of the lock.

These couplers are made of OPEN HEARTH CAST STEEL with either 5″ by 5″ neck or 5″ by 7″ neck, as desired, the knuckles and fittings being identical for both styles of coupler.

Manufactured Exclusively by

THE McCONWAY & TORLEY CO.

PITTSBURGH, PA.

LATROBE
STEEL AND COUPLER CO.

CHICAGO COUPLERS
MUNTON COUPLERS
(ALL STEEL)

FOR FREIGHT AND PASSENGER CARS
AND FOR LOCOMOTIVE PILOTS AND TENDERS

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Illinois

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OUR LATEST COUPLER

STRENGTH | ECONOMY | SIMPLICITY

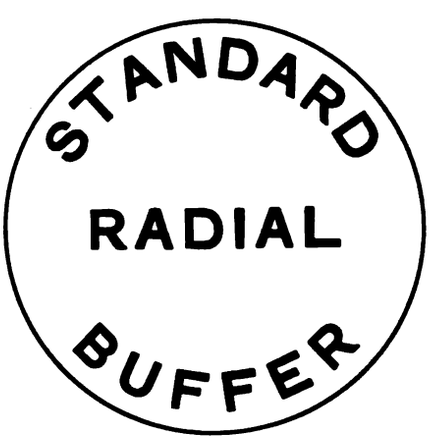
NOTE SOLID FACED KNUCKLE WITH LINK SLOT AND OTHER NEW FEATURES

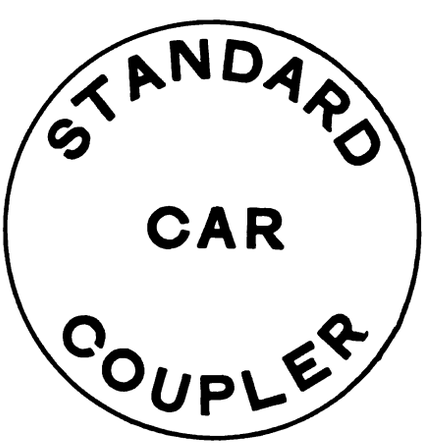
WASHBURN COUPLER COMPANY, MINNEAPOLIS, MINN.

STANDARD
STEEL
PLATFORM

SESSIONS-STANDARD
FRICTION
DRAFT-GEAR

MADE BY
STANDARD
COUPLER
COMPANY
160 BROADWAY
NEW YORK


STANDARD
RADIAL
BUFFER


STANDARD
CAR
COUPLER

THE

"BUCKEYE" AND "MAJOR"

COUPLERS

Made of Either Malleable Iron or Cast Steel
Steel Knuckles and Repair Parts in Stock

GENERAL

STEEL CASTINGS AND BOLSTERS

FOR PROMPT DELIVERY CAPACITY 200 TONS A DAY

IRON, SEMI-STEEL AND STEEL BRAKE SHOES

FOR LOCOMOTIVES AND CARS

THE

Buckeye Malleable Iron & Coupler Co.

General Offices and Works, COLUMBUS, O.

CHICAGO OFFICE
J. L. YALE & CO., The Rookery

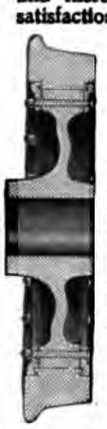
PHILADELPHIA OFFICE
DAVIS & BRYAN, Arcade Building

KRUPP

STEEL TIRES.

On Locomotive Driving Wheels, and on Steel-Tired Wheels, Give the Best Results for Every Variety of Service.

After a test of over 35 years, the "KRUPP TIRE" has proved itself the best in the market, and parties intending ordering Locomotives would do well to insert in their specifications that "KRUPP TIRES" be used on drivers, and thereby obtain an article which will give entire satisfaction.



KRUPP'S No. 1 WHEEL.

WROUGHT IRON COIL DISC CENTRE FITTED WITH STEEL TIRE AND RETAINING RINGS.

Parties intending ordering rolling stock would find it economy to insert in their specifications that Krupp's No. 1 Wheel be used, and thereby obtain a wheel which will give satisfaction.

Crank Pins, Piston Rods, Spring and Tool Steel, Steel-Tired Wheels, Axles, Shafts and Steel Forgings up to Seventy Tons, Steel Castings, etc. Steel of Every Description Forged, Rolled, etc., into any Form of Article Desired.

THOMAS PROSSER & SON,

15 Gold St., New York. Old Colony Bldg., Chicago.

DRAFT RIGGING

OVER

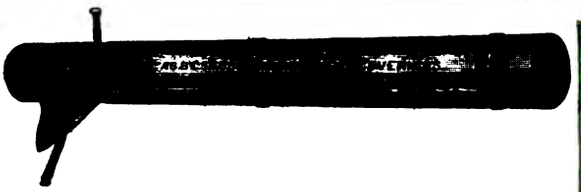
100,000 CARS EQUIPPED

THE THORNBURGH COUPLER ATTACHMENTS CO.
LIMITED

1014-1017 MAJESTIC BLDG.

DETROIT, MICH.

Patented



THESE ARE SOME

of our railroad specialties.

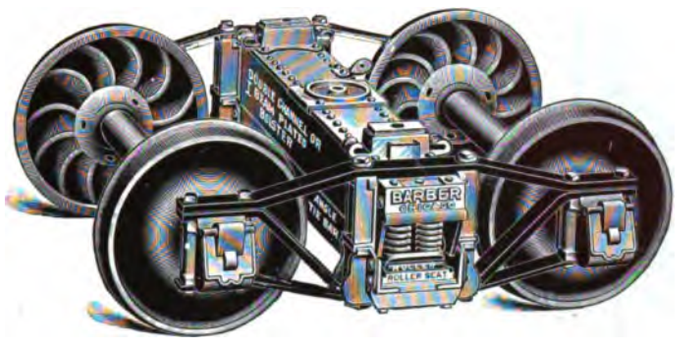
We make also PERFECTION JOURNAL BOX PACKING and WOOL WASTE.

FRANKLIN MFG. CO.

FRANKLIN, PA.

Patented

C. J. S. MILLER, PRESIDENT



60,000 CARS EQUIPPED AND IN USE

To reduce train resistance, broken wheel flanges, wear on coupler knuckles, and for uniform distribution of load over journals, use only the

BARBER

all metal roller bearing, lateral motion trucks; with either channel, I beam, cast or pressed steel bolsters.

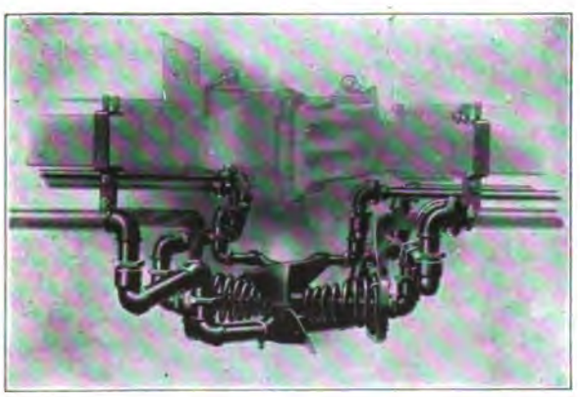
STANDARD CAR TRUCK CO.

OLD COLONY BLDG., CHICAGO.

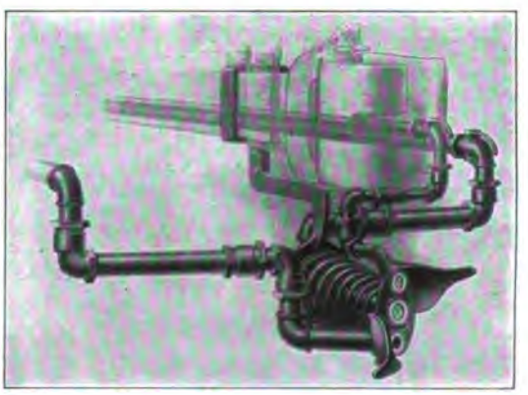
THE FORSYTH AUTOMATIC AIR AND STEAM COUPLER CO.

THE ROOKERY, CHICAGO

No Rubber in This Construction



This illustration shows the device as it appears on passenger cars when coupled, the springs being compressed, by the coupling of the cars, so that a pressure is obtained sufficient to hold the coupling heads firmly together and prevent any possible leakage.



For the purpose of interchange with passenger cars not equipped with the Automatic Coupler, an emergency head is furnished, to which hose connection can be easily made.

In Regular Service on a Number of Leading Trunk Lines. **Illustrations on page 131 of this Book.**

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The Buda Foundry & Manufacturing Co.

HARVEY, COOK CO., ILL.

Manufacturers of

Railroad Specialties

Section Hand and Push Cars with Steel Wheels
Switch Material and Track Tools
Railway Pneumatic Crossing Gates

Chicago Office - Monadnock Block

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CAR WHEEL CO.

MANUFACTURER OF

CAR WHEELS.

SPECIALTY

Wheels for Electric Railways

Satisfaction Guaranteed

Main Office, 1209 Park Bldg.,
PITTSBURG, PA.

Eastern Office, 507 Girard Bldg.,
PHILADELPHIA, PA.

The Standard Steel Works

HARRISON BUILDING, PHILADELPHIA

TIRES

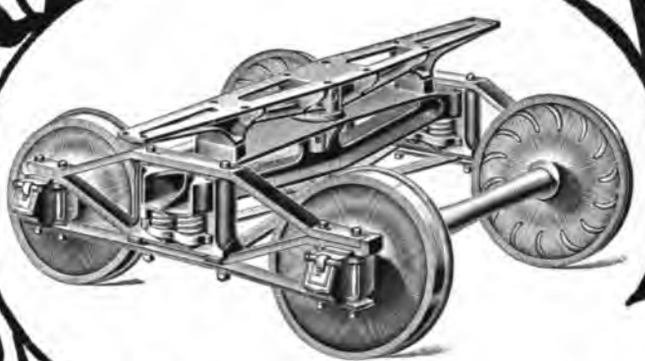
STEEL TIRED WHEELS

With Centers of Wrought Iron, Cast Steel or Cast Iron

FOR ALL CLASSES OF SERVICE

STEEL CASTINGS and STEEL FORGINGS for Locomotive Work

THE BEST TRUCK
FOR ALL
FREIGHT CARS



COMMONWEALTH TRUCK

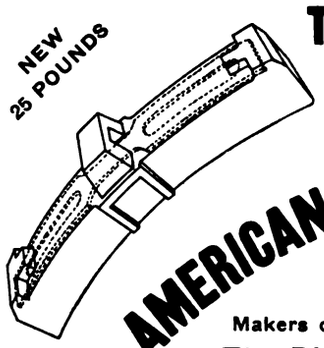
COMMONWEALTH SWING TRUCK

COMMONWEALTH STEEL CO.

GENERAL OFFICES BANK OF COMMERCE BUILDING
ST. LOUIS, U. S. A.

WORKS: GRANITE CITY, ILL.

CAPACITY: TRUCKS FOR 150 CARS PER DAY.



THE STEEL BACK CAR SHOE

CANNOT BE DISABLED IN THE MOST SEVERE SERVICE

AMERICAN BRAKESHOE AND FOUNDRY CO.

170 Broadway, N. Y.

Western Union Building, Chicago

Makers of

The Diamond "S," Lappin, Sargent, Streeter, Corning, Herron, "U," Cardwell and other types of

Brake Shoes for Modern Railway Service

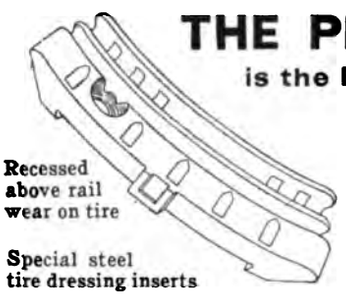
MISCELLANEOUS IRON CASTINGS

TROPENAS STEEL CASTINGS

STEEL BACKS can be applied to all types of LOCOMOTIVE and CAR SHOES and double the life

THE PERFECTO DRIVER SHOE

is the Best Shoe for General Engine Service



Recessed above rail wear on tire

Special steel tire dressing inserts

EFFICIENT
DURABLE
ECONOMICAL

Ends chilled from back

Steel back
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The Interlocking Brake Shoe

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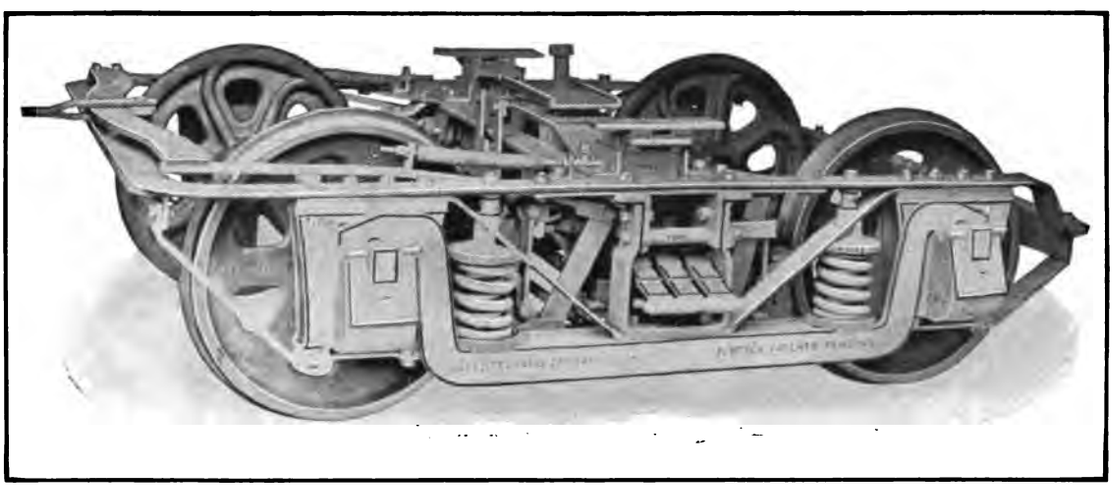

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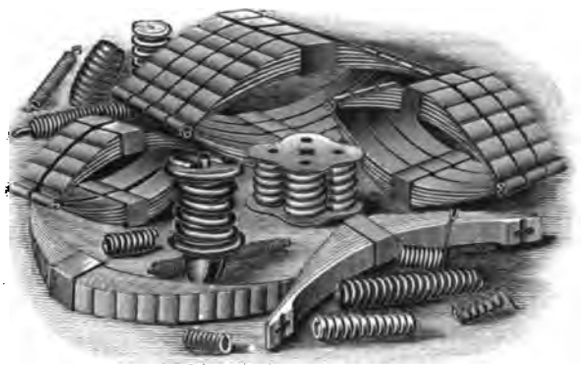

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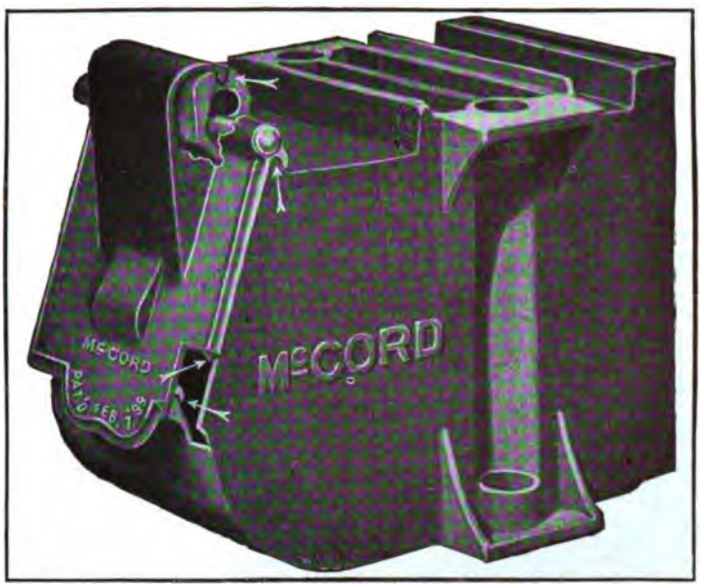

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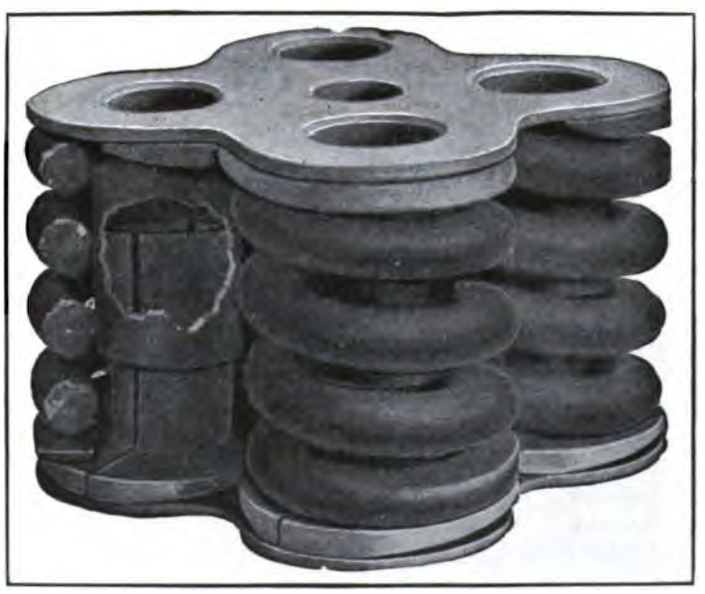

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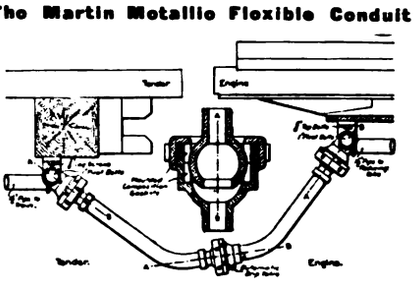

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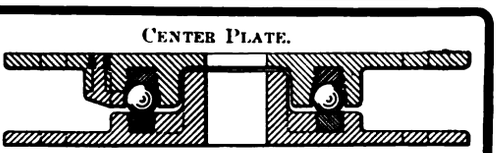

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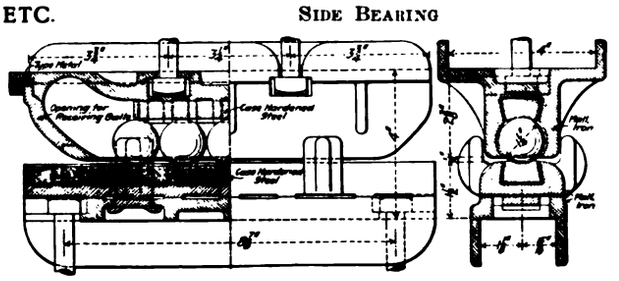

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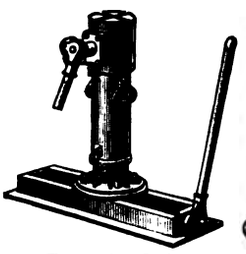
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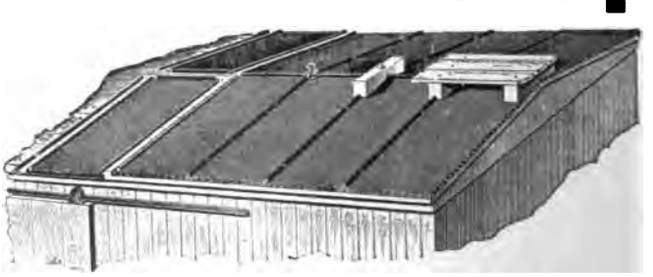

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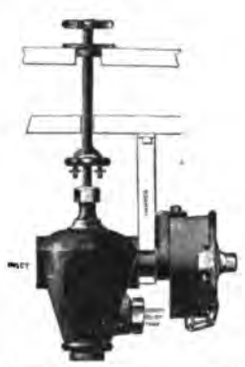

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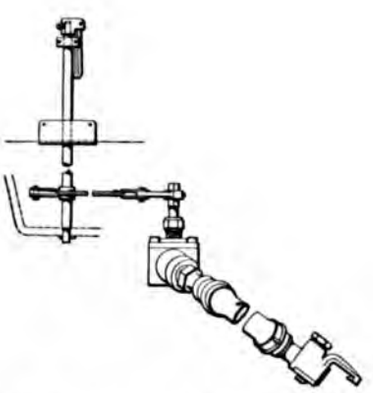

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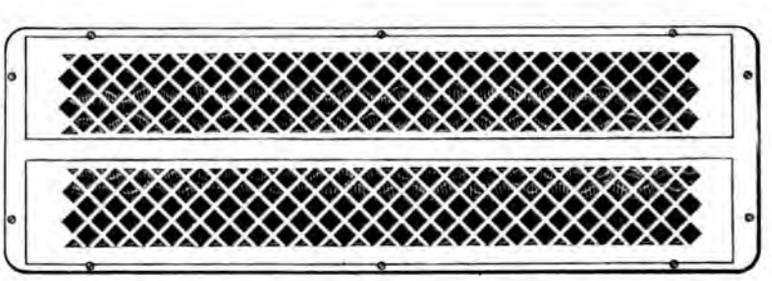

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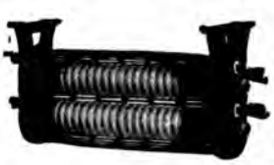

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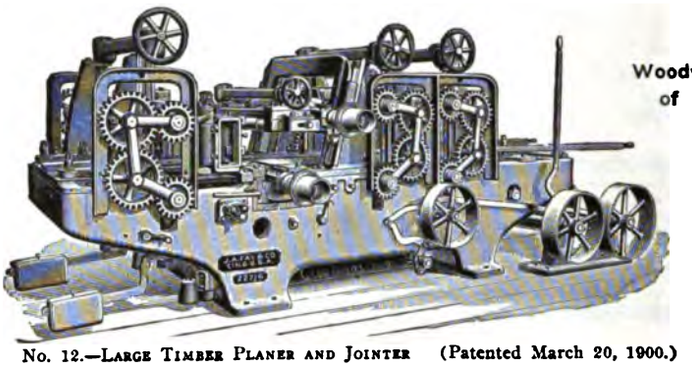

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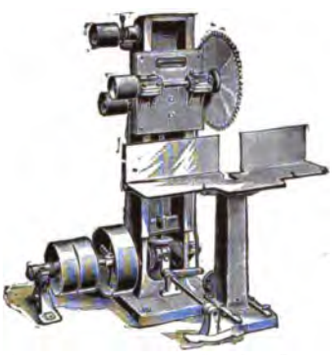

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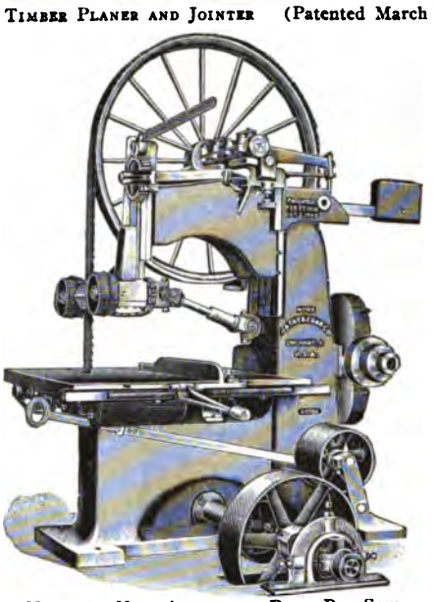

No. 109.—New Automatic Band Rip Saw.
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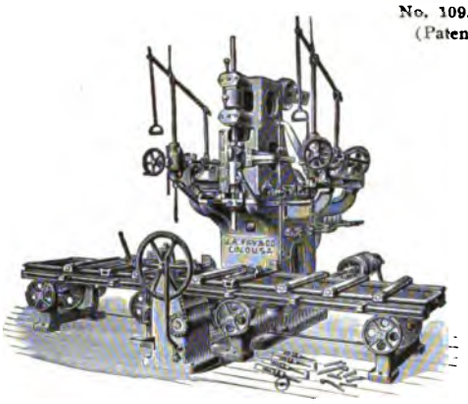

No. 4.—Vertical Hollow-Chisel Car Mortiser.
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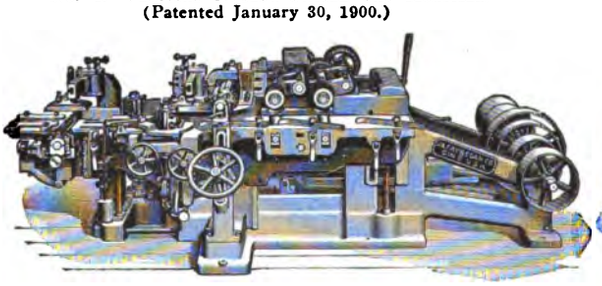
No. 85.—Improved Double Spindle Shaper



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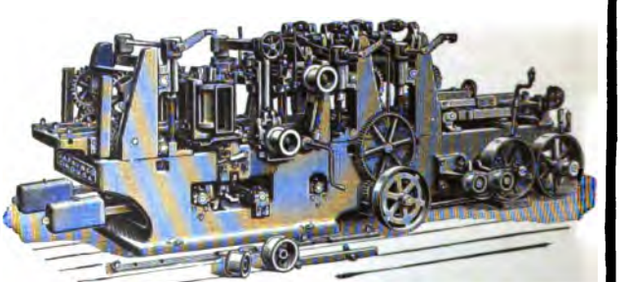

No. 26.—New Double Cylinder Timber Planer, Matcher and Jointer.
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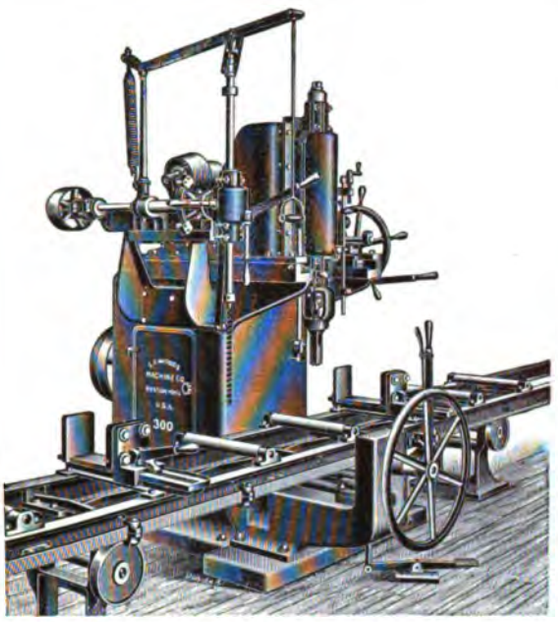

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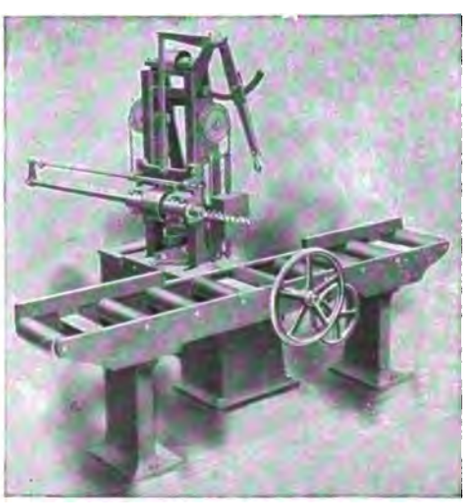

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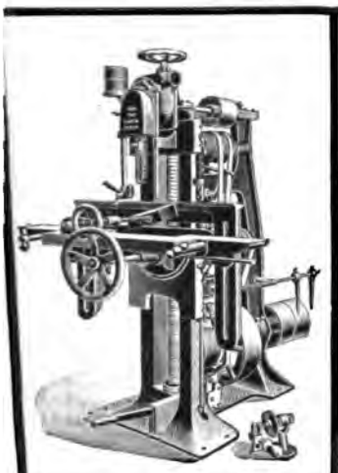

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SOLE MANUFACTURERS OF THE

AJAX

Bolt and Rivet Heading Machines
Upsetting and Forging Machines
Forging or Tapering Rolls
Bulldozers or Bending Machines
Hot Pressed Nut Machines
Multiple Spindle Drills

The Safety Car Heating and Lighting Co.

General Office: 160 Broadway, New York

Branch Offices: { **1015 Missouri Trust Building, St. Louis**
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Steam Heating for Railroad Cars

Heating by the Standard System of Hot Water Circulation is effected by the application of steam jackets to the Baker or other similar heater pipes, the seal of the pipes remaining unbroken, allowing a fire to be used in the heater, whether steam be used or not, without adjustment of valves. Either salt or fresh water can be used in the circulating pipes.

Less steam pressure is required than by any other water circulating system operated by steam. The arrangement of the steam jackets insures very rapid circulation, and the large amount of heating surface used produces abundant heat during excessively low temperatures.

The Direct Steam Regulating System provides a positive means of regulating the heat in the cars under all changes of temperature.

The Direct Steam System; temperature regulated by a graduating valve; radiating pipes drain from inlet to point of discharge.

Return Train Pipe System, applicable to either hot water or direct steam systems, obviates the discharging of condensation upon tracks or platforms. The returned condensation discharges into the tender tank, effecting a saving in fuel.

This Company's Systems are used by 130 Railroads of the United States and have been adopted as standard by the Pullman Co.

Straight Port Couplers—Automatic Steam Traps

The Safety Car Heating and Lighting Co.

General Office: 160 Broadway, New York

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Pintsch System Car and Buoy Lighting

This company controls in the United States the celebrated Pintsch System of Car and Buoy Lighting. It is economical, safe, efficient and approved by railway managers and the Light House Board of the United States, and has received the highest awards for excellence at the World's Expositions at Moscow, Vienna, St. Petersburg, London, Berlin, Paris, Chicago, Atlanta and Buffalo. 116,000 cars, 5,000 locomotives and 1,500 buoys are equipped with this light.

200 railroads in the United States have adopted this system of lighting. Applied on over 20,000 cars.

A Graphical illustration of the Progress made in the application of the

Pintsch Lighting System

on the Railroads of the World

Pintsch plants are now in operation in the following cities in the United States, Canada and Mexico:

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Boston, Mass. (2)
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Camden, N. J.
Chattanooga, Tenn.
Chicago, Ill.
Cincinnati, Ohio.
Cleveland, Ohio.
Columbus, Ohio.
Council Bluffs, Ia.
Denver, Col.
Detroit, Mich.
El Paso, Texas.
Fort Worth, Texas.
Hamlet, N. C.
Houston, Texas.
Indianapolis, Ind.
Jacksonville, Fla.
Jersey City, N. J. (4)
Kansas City, Mo.
Long Island City, L. I.
Los Angeles, Cal. (2)
Ludlow, Ky.
Marion, Ohio.
Memphis, Tenn.
Mexico, City of
Minneapolis, Minn.
Mobile, Ala.
Moncton, N. B.
Montreal, Que.
New Haven, Conn.
New York, N. Y. (2)
Oakland, Cal.
Ogden, Utah.
Philadelphia, Pa.
Phillipsburg, N. J.
Pittsburg, Pa.
Portland, Ore.
St. Augustine, Fla.
St. Louis, Mo.
St. Paul, Minn.
San Antonio, Texas.
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Open Hearth Steel Castings

of every description and weight

Truck and Body Bolsters

Ajax—Player and Standard Diamond Trucks

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Leeds Pilot Couplers

and Coupler Knuckles

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and

Plain Driving Wheel Centers

We give special attention to the
production of Steel Shapes for Locomotives

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PITTSBURGH FORGE & IRON CO.

MANUFACTURERS OF OPEN HEARTH STEEL

TO ALL SPECIFICATIONS.

MERCHANT IRON AND REFINED BARS

MADE FROM ALL PUDDLED PIG IRON, A SPECIALTY.

STAY BOLT IRON.

RAILROAD AND MACHINERY FORGINGS.

SPLICE BARS,
ARCH BARS,

TIE PLATES,
TRACK BOLTS.

BRIDGE RODS

WITH PLAIN OR UPSET ENDS, ALL SIZES.

CAPACITY, 60,000 TONS PER ANNUM.

OFFICE, COR. TENTH STREET AND PENN AVENUE,
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PAINTS FOR
RAILROADS
BRIDGES
CARS, ETC.

THE FOREST CITY PAINT & VARNISH CO.
CLEVELAND, O.

JAMES L. HOWARD & CO.
HARTFORD, CONN.
RAILWAY CAR SUPPLIES
Parlor, Sleeping and Day Car Trimmings
In Bronze, Brass, Silver, Nickel, and Oxidized Metals.
Car Lamps Porcelain Ware
PATENT RAILWAY-CAR WATER-CLOSETS AND DRY HOPPERS
WITH AUTOMATIC SEAT-RAISING ATTACHMENT.
Sleeping Car Blankets, Cotton Waste. Importers of Mohair Plushes.

See pages 247, 257 in body of book.

NATIONAL-FULTON BRASS MANUFACTURING CO.

NATIONAL BRONZE

Bronze and Brass Castings

National and Monarch Bronze

FOR HIGH GRADE BEARINGS

MONARCH BRONZE

RAILROADS

For REPAIRING STEEL CARS
For BENT BRIDGE WORK
For BENT ENGINE FRAMES
REMOVING TIRES FROM LOCOS
and Heating Heavy Metal of Every Description

THE BUCKEYE HEATER
very often saves its cost on one job alone

We also make the
Buckeye Painting and Whitewashing Machines

WALTER MACLEOD & CO.
CINCINNATI, OHIO, U.S.A.

AMERICAN DUST GUARD CO.

COLUMBUS, OHIO

Guaranteed to save its cost in one month

Has double the wearing capacity of any other guard.

Write for prices and catalogue.

CHICAGO OFFICES

J. L. YALE & CO.

1117 The Rookery

BUCKEYE PAINT & VARNISH CO.

MANUFACTURERS OF

Freight Car, Bridge and Target Paints

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TOLEDO, OHIO

? The Advertising Question ?

TO be persistent—to keep everlastingly at it, is no doubt what really pays in advertising. This persistence, however, is to no avail unless the proper medium is selected.

If you wish to completely cover the Railroad field and reach the high officers (men having the power to purchase), advertise in the Railroad Gazette. It is not only the oldest railroad paper published, but its Publicity pages are more attractive; its advertising patronage far in excess of that of any railroad paper, and among railroad officers the circulation is greater than all other railroad papers combined.

Railroad Gazette

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The Harrison Lubricator

A saving of 50 per cent. in bearings guaranteed, and a larger saving in oil and waste

THE HARRISON-WILLIAMS CO.

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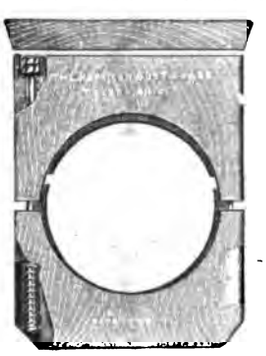
The Harrison Dust Guard

GUARANTEED to save its cost over any other guard



In use in nearly all parts of the world

The only Guard ever showing a saving in 30 days in brass alone sufficient to save its cost

THE HARRISON DUST GUARD CO.

TOLEDO, O., and MONTREAL, QUE.

The "Blount"

DOOR CHECK AND SPRING FOR Railroad Coach Doors.

This device is an important recent addition to the equipment of railroad coaches. It promotes the convenience and safety of passengers and economy in service and repairs.

It is also in successful use on the doors of ferry boats where the conditions are exceptionally severe. A catalogue giving a detailed description of its construction, etc., will be forwarded on request.

The Yale & Towne Mfg. Company,

Nos. 9-11-13 Murray Street,

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ARCTIC

CAR JOURNAL BEARINGS

ALWAYS COOL

HOO-HOO and REX Babbitt Metal for Engines

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MORE-JONES BRASS & METAL COMPANY

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An Absolute Protection for Car Roofs and Trucks

SUPERIOR GRAPHITE PAINT

UNEXCELLED FOR ALL RAILROAD WORK

Manufactured only by

Detroit Graphite Mfg. Co.

DETROIT, MICH.

NEW YORK BOSTON CHICAGO

SEE PAGE Nos. 149, 152

CHICAGO SWIVEL GRAIN DOOR IS THE BEST

SECURITY LOCK BRACKETS MAKE CAR DOORS THIEF PROOF

CHICAGO GRAIN DOOR CO., CHICAGO

The

Wellman-Seaver-Morgan Engineering Company

Manufacturers of

Steel Castings for All Classes of Work
The Street Tandem Draft Gear
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Also Engineers and Builders of

Steel Works, Foundries, Electric Traveling Cranes and Special Hoisting Machinery of any description

CLEVELAND, OHIO

THE "ACME"

Car Vestibule Diaphragm

Made in types adjustable to Pullman, Gould, American Car Foundry and other vestibules.

Lasts twice as long as rubber; costs much less

As its name implies—the most perfect diaphragm made.

Guaranteed absolutely for 5 years and warranted superior to rubber diaphragms or other makes of canvas diaphragms.

Made of specially woven canvas belting, sewed with double seams of 7-strand Irish linen thread, thoroughly waxed and lock stitched. We also make a combined sewed and rivetted diaphragm.

Bound on edges with very best material. Does not sag. In use on the principal railroads in U. S. A. and Canada.

G. S. WOOD & CO.

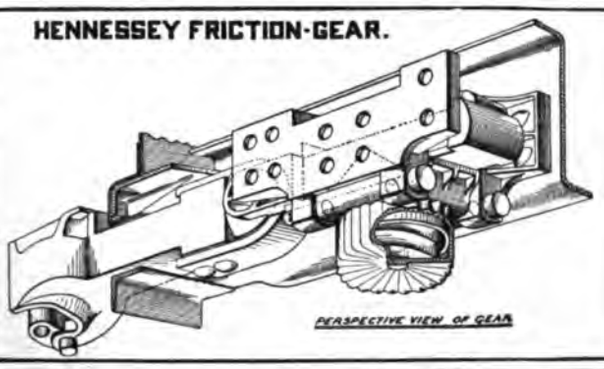
100 Lake St. Chicago, Ill.

W. H. MINER

RAILWAY SUPPLIES

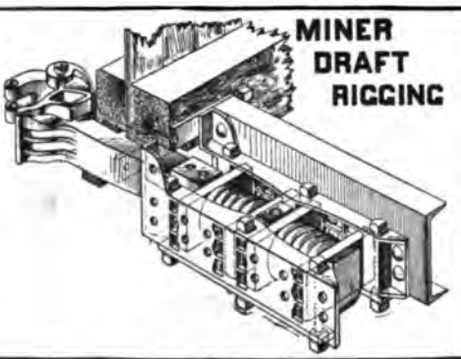
669 "ROOKERY" CHICAGO

HENNESSEY FRICTION-GEAR.



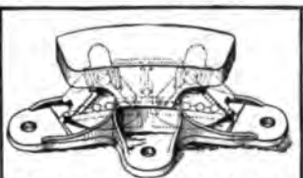
PERSPECTIVE VIEW OF GEAR

MINER DRAFT RIGGING



BRYAN DRAFT RIGGING

LA-FLARE INSULATION FOR REFRIGERATOR CAR DOORS



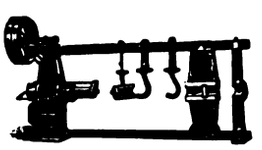
GRAVITY SIDEBEARING

HUNT DRAIN CUP

PERFECTION BOLT KEEPER FOR REFRIGERATOR CAR DOORS

All

Watson-Stillman Hydraulic Jacks



Are

"Cracker-Jacks"

and we make more than 250 different kinds.

Jacks without forced joints or welds—with RAMS made from a single piece of high grade carbon steel, and CYLINDERS bored from solid stock, no so called seamless tube.

And you pay no more for our Jacks than you do for inferior kinds.

We would like you to know more about our Hydraulic Jacks—Car Wheel Presses—and Rail Benders, and will be pleased to answer all inquiries.

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200-210 E. 43rd St. NEW YORK CITY

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TRADE MARK

"FABRIKOID"

LEATHER

FOR UPHOLSTERY
and CAR CURTAINS

"Better Than The Real Hide"

FOR SAMPLES AND PRICES
ADDRESS

Fabrikoid Company

Newburgh, N. Y.

No. 19 Automatic Lowering Jack.

Barrett Automatic Lowering Jacks for Car Shops

QUICK
SAFE
POWERFUL

Headquarters also for

Hydraulic and Screw Jacks
Section Hand Cars
Section Push Cars
Velocipedes
Motor Cars

RELIABLE RAILWAY SUPPLIES

FAIRBANKS, MORSE & CO.

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St. Louis. Cleveland. Indianapolis. Louisville. Minneapolis.
St. Paul. Omaha. Kansas City. Cincinnati. Salt Lake City. London, England.
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Superior Charcoal —Iron— Company

Grand Rapids, Michigan

Manufacturers of

Car Wheel, Malleable Special Cylinder and Streng Foundry Irons

The well known brands of Lake Superior Charcoal Pig Iron

Marquette **Pioneer** **Champion**
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T. H. SYMINGTON COMPANY
BALTIMORE, MD.

JOURNAL BOXES
AND
DUST GUARDS
CAPACITY 3,000 PER DAY

SAVE AXLE WEAR
BRASS WEAR
OIL CONSUMPTION
BY USING A
DUST PROOF JOURNAL BOX
WHICH ALSO
HOLDS PACKING IN POSITION

The
AJAX
DIAPHRAGM

Manufactured and Controlled by

RAILWAY
APPLIANCES
COMPANY

CHICAGO: Old Colony Bldg.
NEW YORK: 114 Liberty St.

See illustration on page 189 of this book

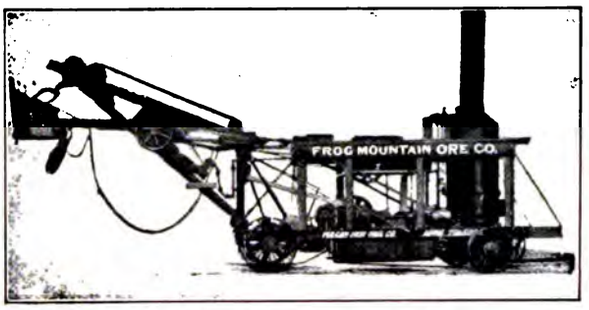
SIMPLEX BOLSTERS
BRAKE BEAMS
SIDE BEARINGS

SIMPLEX RAILWAY APPLIANCE CO.

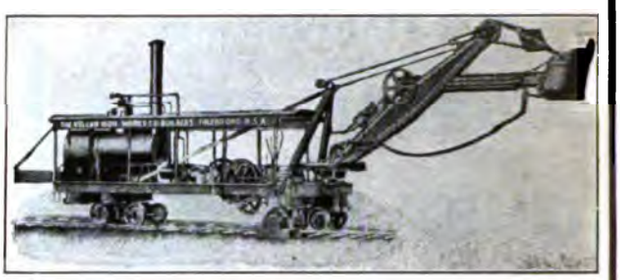
OFFICE AND WORKS, HAMMOND, IND.

CHICAGO OFFICE, Fisher Building
NEW YORK OFFICE, Washington Life Building

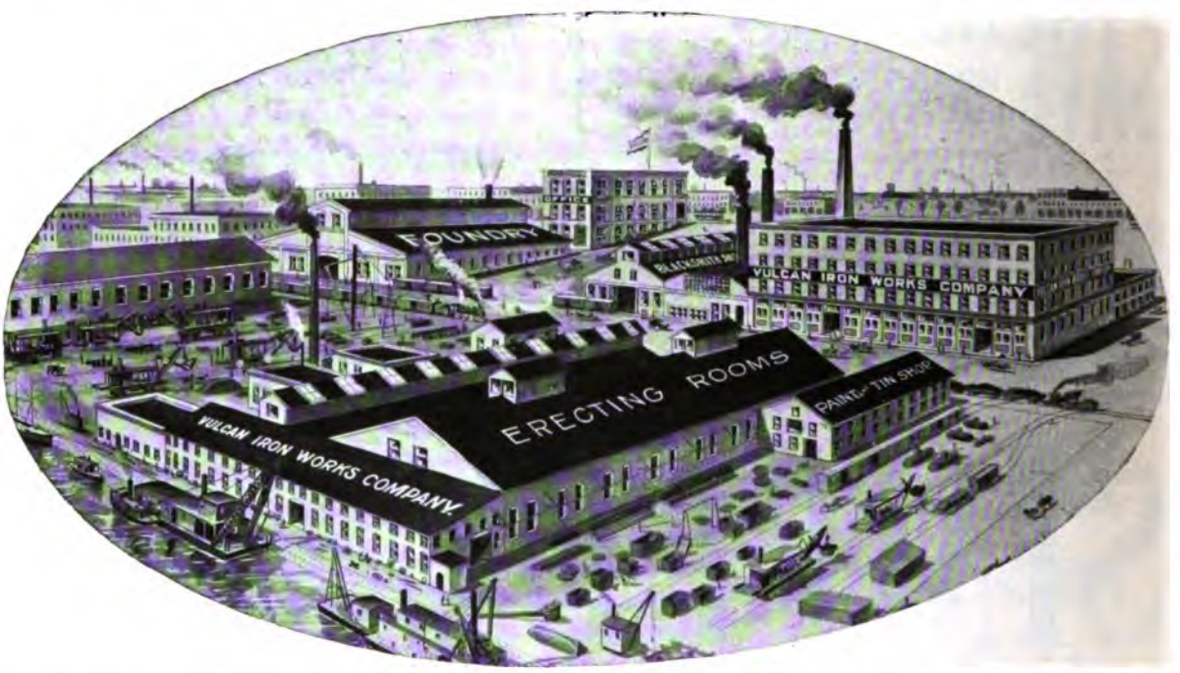
Steam Shovels



"LITTLE GIANT" 26 TONS



"GIANT C BOOM" 70 TONS



"GIANT D BOOM" 45 TONS

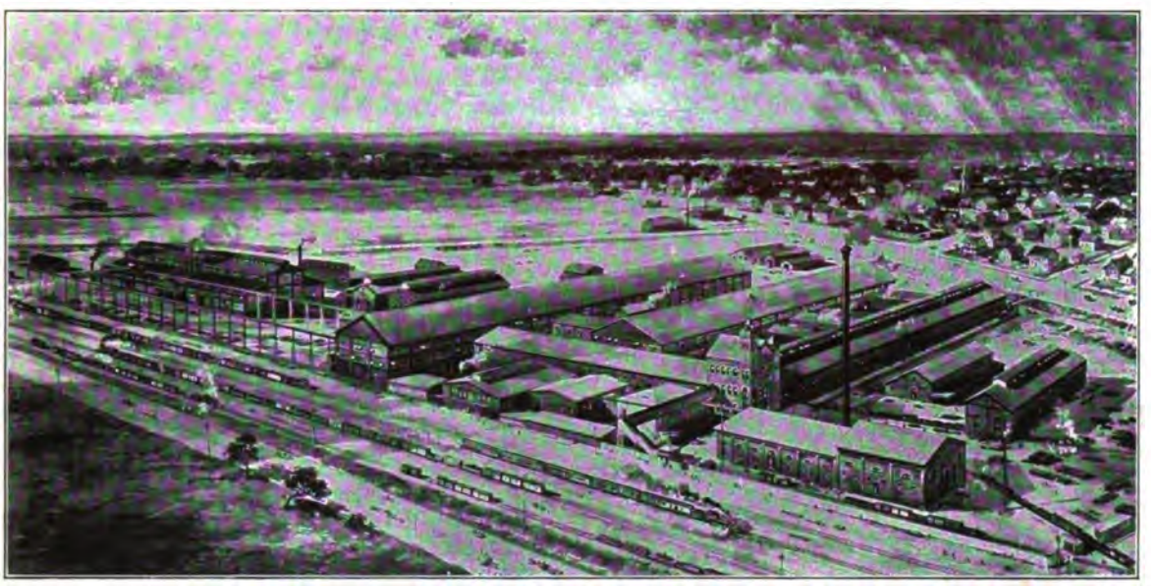
"GIANT C" IN OPERATION

Specifications and Description Upon Application

The VULCAN IRON WORKS COMPANY
TOLEDO, OHIO, U. S. A.

The Morgan Engineering Co.

Alliance, Ohio, U. S. A.



BIRD'S-EYE VIEW OF PLANT—ALLIANCE, OHIO

MANUFACTURERS of Steam, Hydraulic, Electric, Pneumatic and Power Machinery for Government, Railways, Iron, Steel and Engineering Works. Gun and Mortar Carriages, Steam Hammers, Overhead Electric Traveling Cranes, Locomotive, Gantry, Jib and Derrick Cranes, Hydraulic Presses for forging and other purposes, Punching, Shearing, Bending, Flanging and Riveting Machines. Patented Vertical and Horizontal Charging Machines, Ingot Extractors, Feed Tables, Morgan's Reversible Electric Controllers for series wound motors for all purposes. Hydraulic Valves for high and low pressures. Special Machinery for the quick handling of material for Bessemer and Open Hearth Furnaces and Rolling Mills, and for any modern purpose.

Attention is called to our excellent facilities for turning out promptly Electric Traveling Cranes of all descriptions, Steam Hammers of all sizes and types and our special machinery for modern Bessemer and Open Hearth Furnaces and Rolling Mills.

THE ADLAKE ACETYLENE GAS CAR-LIGHTING SYSTEM

ALL THE GAS YOU WANT WHEN YOU WANT IT

Independent Lighting Equipment for Each Car

ECONOMY OF SPACE

Each Car Its Own Gas Plant

Generation Controlled Automatically

No Skill Required

Perfectly Clean in Operation and Free From Odor

Can be Placed in any Class of Car

SPACE OCCUPIED 11x35x78 INCHES

COSTS LESS TO INSTALL AND OPERATE THAN ANY OTHER GAS OR ELECTRIC LIGHTING SYSTEM

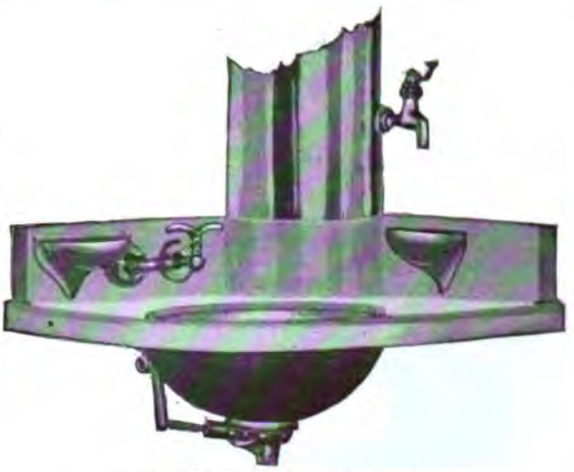
Now in Use on Some of the Largest Railways in the Country

CHAIR CAR
EQUIPPED WITH THE
ADLAKE ACETYLENE GAS CAR-LIGHTING SYSTEM.

THE ADAMS & WESTLAKE CO.

CHICAGO PHILADELPHIA NEW YORK

Railway Lanterns.



"Ajax" White Metal Washstands.

Coach Tail Lamps.

THE ADAMS & WESTLAKE CO.

Manufacturers and Dealers in

RAILWAY COACH TRIMMINGS

COACH LAMPS

SIGNAL LAMPS

SWITCH LAMPS

HEADLIGHTS

SWITCH LOCKS

WASHSTANDS

LANTERNS, Etc., Etc.

Acme Oil Chandeliers.

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STEAMSHIP TRIMMINGS

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DOOR LOCKS

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Eastern Shops

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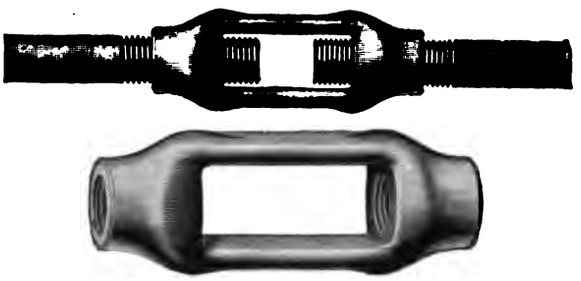
Basket Racks.

Sash Locks.

PRESSED WROUGHT IRON

OPEN TURNBUCKLES

IRON and STEEL AXLES



CAR FORGINGS of all kinds

CLEVELAND CITY FORGE & IRON CO.

CLEVELAND, OHIO

THE CHAPMAN JACK

PATENTED

ALWAYS LUBRICATEB AND READY FOR USE.

Screw Protected From Dirt and Rust.

THE BEST AND CONSIDERING QUALITY THE CHEAPEST

THE CHAPMAN JACK COMPANY

CLEVELAND, OHIO

The BUTLER ATTACHMENT

STRONG, DURABLE, ECONOMICAL, GUARANTEED

Contains many merits. Constantly growing in favor and service. **An Absolute Spring Protector.** Has less parts, costs less to apply and maintain than any other attachment.

OVER 300,000 CARS Now Equipped in Every Kind of Service

Our Heavy No. 68, Yoke attachment, up to date, gives absolute satisfaction. We can furnish Butler Attachments, with Tandem or Twin Arranged Springs of any capacity.

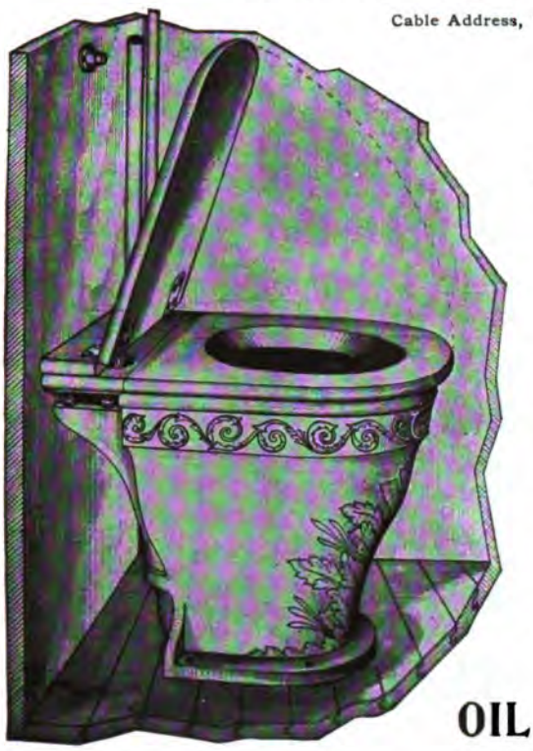
THE BUTLER DRAWBAR ATTACHMENT CO.

CLEVELAND, OHIO

The Dayton Manufacturing Company,

DAYTON, OHIO, U. S. A.

Cable Address, "Vapor" Dayton Lieber's Code, A B C, 5th Edition, used



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AND DEALERS IN

TRIMMINGS

FOR

Steam and Street Railroads,
Oil and Acetylene Gas Lamps,
Electric Light Fixtures,
Water and Dry Closets,

FOR

Sleeping, Parlor and Day Coaches.

OIL AND ELECTRIC HEADLIGHTS

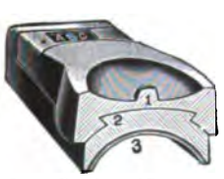
A. B. C. JOURNAL BEARINGS

A. B. C. Self-Adjusting Bearing Complete

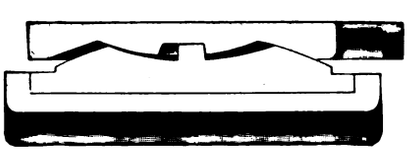
The concave-convex parts of the bearing engage the convex-concave parts of the wedge and allow for horizontal, lateral and vertical movements of the bearing, evenly distributing the load along the central line of the journal.

THEY fit any standard M. C. B. journal box.—They interchange with M. C. B. bearings, as the A. B. C. wedge fits perfectly both the A. B. C. and M. C. B. bearings.—They lessen the strain on rails and wheels, and reduce flange wear.—The use of the malleable iron back reduces the cost of the bearing, gives it additional strength and does not lessen the mileage.—The first cost shows a saving of three to ten dollars per car, the amount depending on the size of the journal used and the metal specified. Their adoption will greatly reduce the actual service cost of your bearings, as their mileage is equal to that of any other bearing, and we guarantee to take back the scrap brasses and replace them with new ones at a price which will show a saving of at least ten per cent in actual service cost.

Showing Brass and Malleable Back of Bearing Separated



Cross Section of Bearing
1—Malleable Iron Back
2—Brass 3—Babbitt



Longitudinal Middle Section
Showing how strains resulting from side thrusts are lessened

A. B. C. Wedge Fitting
M. C. B. Bearing

ATLANTIC BRASS CO., 192 BROADWAY, NEW YORK

THE NEW

SAFETY STORAGE SYSTEM OF ACETYLENE LIGHTING

THE IDEAL SYSTEM FOR THE LIGHTING OF RAILWAY CARS, STATIONS, SHOPS, SIGNAL TOWERS, ETC., AND ALSO FOR

Yachts, Steamboats, Sailing Vessels and Marine Craft of every description

One cylinder, such as is ordinarily used for gas lighting on a railway car, will take a car from New York to San Francisco and back four times without recharging.

The only method of using acetylene on cars or on board marine vessels that is absolutely safe.

The system has been thoroughly tested and demonstrated in France, England and the United States.

For prices and full information address

THE PYLE-NATIONAL ELECTRIC HEADLIGHT CO.

1425-6-7 MONADNOCK BLOCK, CHICAGO

OR

THE COMMERCIAL ACETYLENE COMPANY

80 BROADWAY, NEW YORK

LOWE BROTHERS PREPARED

LINSEED OIL

PAINTS for the PRESERVATION and PROTECTION of STEEL

in Buildings, Bridges, Railway Equipment and General Manufacturing

Among their well known products are included:

RED LEAD METAL PRESERVATIVE (two colors).
BLACK METAL COATING No. 1407.
GRAPHITE PAINTS.
CARBON PAINTS (four colors).
OXIDE OF IRON PAINTS (three colors).

For Stations, Passenger Coaches, Freight Cars, etc.

Lowe Brothers High Standard Liquid Station Paints, Cadmium Yellow and other Coach Colors, Semi-Paste Freight Car Paint, etc., etc.

The principles upon which they are made and used are fully discussed in "Hints on Painting Structural Steel," "Suggestions for Specifications," the new Railroad Color book, etc. Sent on application. Correspondence solicited.

The Lowe Brothers Company

DAYTON, O. — NEW YORK
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SAMSON BRAIDED CORDAGE

BELL CORD, SIGNAL CORD, COUPLINGS AND HOOKS, SASH CORD, TROLLEY CORD, Etc.

Send for Samples and Catalogue.

Samson Cordage Works,

BOSTON, MASS.

W. C. DE ARMOND, President
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MANUFACTURERS OF

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